Development Kit User Guide

AirPrime Q26 Series

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8.0
May 09, 2012

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Due to the nature of wireless communications, transmission and reception of data can never be guaranteed. Data may be delayed, corrupted (i.e., have errors) or be totally lost. Although significant delays or losses of data are rare when wireless devices such as the Sierra Wireless modem are used in a normal manner with a well-constructed network, the Sierra Wireless modem should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death, or loss of property. Sierra Wireless accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the Sierra Wireless modem, or for failure of the Sierra Wireless modem to transmit or receive such data.

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Document History

Version	Date	Updates
001	June 2005	Creation (Preliminary version)
002	Sept 2005	Update for the development kit Q26 version2
003	May 2006	Update for the development kit Q26 version3 • Add new for the parallel bus interface (for Wireless CPU Q2687 only) • New GPIO for CHARGER LED • New values around the AUDIO1 filters • Measure of current simplified • New schematics
004	Sept 2006	• Update the document references • Add new for the auxiliary DAC function • Update the Measures of current
005	August 09, 2010	Added information throughout the document for Q26 Extreme and Q26 Elite. Updated information throughout the document for Q2686 Refreshed and Q2687 Refreshed. Added section 4 Signal Name Comparison. Updated Table 3: Pin Description of the External Board Connector (J201). Updated section 19 Antenna Function.
006	September 29, 2010	Updated section 22.1 Unpacking the Development Kit Components.
007	October 05, 2010	Updated section 22.1 Unpacking the Development Kit Components – returned GPS antenna in the list and added a note saying it is only for use with the Q26 embedded module.
8.0	May 09, 2012	Added Q2698 compatibility. Removed all information pertaining to Q26 Extreme; removed all information regarding parallel bus.

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1. Introduction

1.1. Overview

This document describes the AirPrime Q26 Series Development Kit (motherboard V3.2, reference: 1400666-B) and how it integrates with the Q26 series embedded modules. The Q26 embedded modules supported by the Q26 series development kit are:

- Q2686 Refreshed which is GSM/GPRS class 10 capable
- Q2687 Refreshed which is GSM/GPRS class 10 and EDGE class 10 capable
- Q26 Elite which is CDMA2000 capable
- Q2698 which is EDGE 2G/WCDMA 3G/HSxPA capable

This document also discusses the different interfaces and peripheral connections supported by the Q26 series development kit and provide schematics to facilitate the user's understanding and configuration of the development kit board for their own application use.

The Q26 Series Development Kit Board may be used to develop both software and hardware applications based on the Q26 series embedded modules.

For more information about the Q26 Series of embedded modules or the Open AT Framework, refer to the documents in section 1.2.1 Reference Documents.

1.2. References

1.2.1. Reference Documents

For more details, several reference documents may be consulted. The Sierra Wireless documents referenced herein are provided in the Sierra Wireless documentation package.

[1] MOTHERBOARD Development Kit Schematics and PCB, Release 3.2
Reference: 1400666-B

[2] Product Technical Specification and Customer Design Guidelines for AirPrime Q2686 Refreshed
Reference: 4111963

[3] Product Technical Specification and Customer Design Guidelines for AirPrime Q2687 Refreshed
Reference: 4111964

[4] AirPrime Q26 Elite Product Technical Specification and Customer Design Guideline
Reference: 4111804

[5] Open AT Framework AT Commands Interface Guide for Firmware 7.50
Reference: 4111843

[6] AirPrime Q26Elite User Guide & AT Commands Interface Specification
Reference: 4111803

[7] Product Technical Specification and Customer Design Guidelines for AirPrime Q2698
Reference: 4111754

1.2.2. List of Abbreviations

Abbreviation	Definition
ADC	Analog to Digital Converter
AUX	Auxiliary
CLK	Clock
CPU	Central Process Unit
CTS	Clear To Send
DAC	Digital to Analog Converter
DAI	Digital Audio Interface
DC	Direct Current
DCD	Data Carrier Detect
DCE	Data Communication Equipment
DSR	Data Set Ready
DTE	Data Terminal Equipment
DTR	Data Terminal Ready
ESD	Electrostatic Discharges
GND	Ground
GPI	General Purpose Input
GPIO	General Purpose Input Output
GPO	General Purpose Output
I/O	Input / Output
MIC	Microphone
PC	Personal Computer
PCB	Printed Circuit Board.
PCM	Pulse Code Modulation
PWM	Pulse Width Modulation
RF	Radio Frequency
RI	Ring Indicator
RTC	Real Time Clock
RTS	Request To Send
RXD	Receive Data
SCI	Smart Card Interface
SIM	Subscriber Identity Module
SPI	Serial Peripheral Interface
SPK	Speaker
TP	Test Point
TXD	Transmit Data
USB	Universal Serial Bus

2. Q26 Series Development Kit Description

The following figure shows the top view of the Q26 Series Development Kit board. It enumerates the locations of the several ports and interfaces available.

For further information on the component design, please refer to section 22 Appendix.

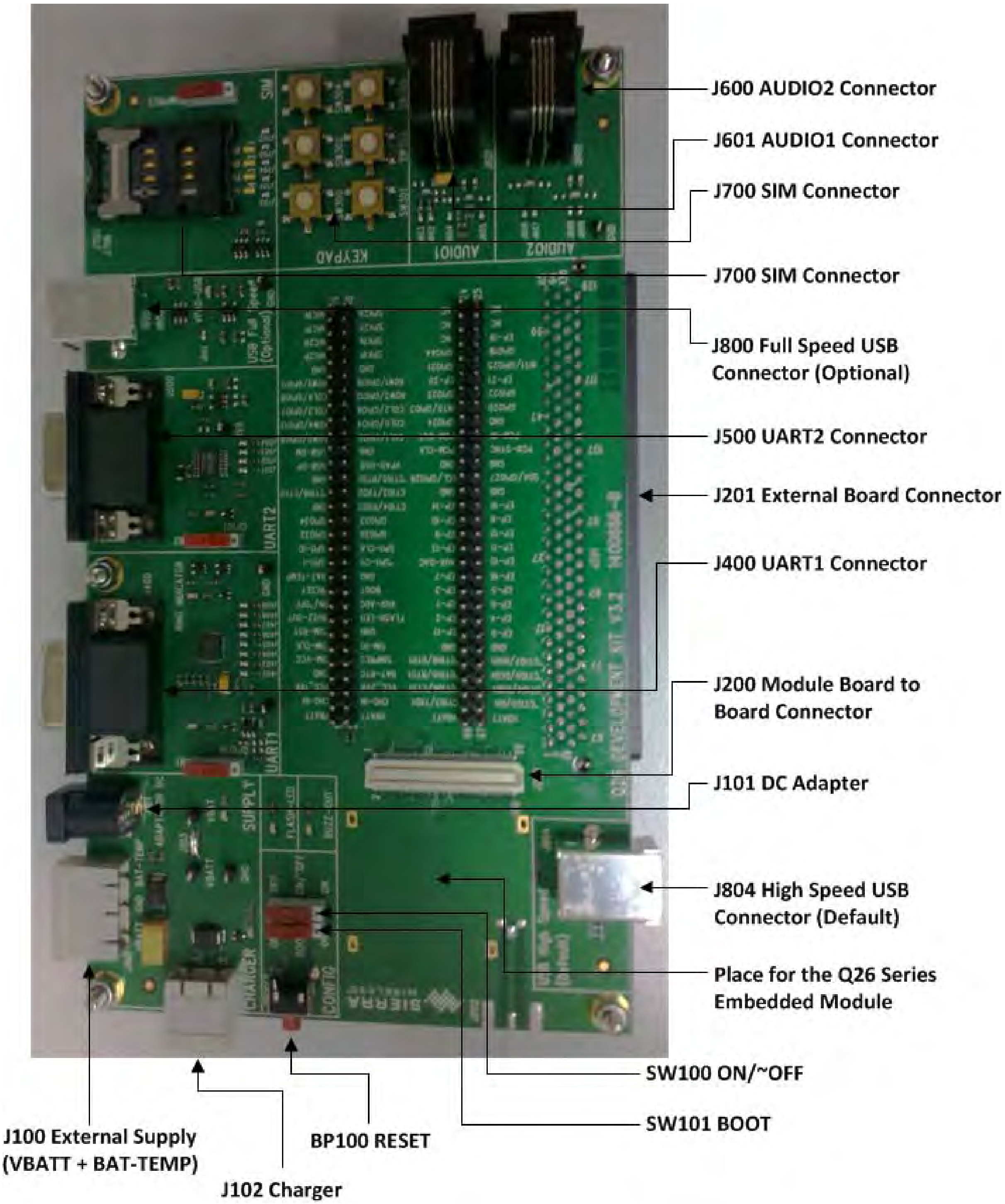


Figure 1. Q26 Series Development Kit – Top View

3. General Description

3.1. Q26 Series Development Kit

The Q26 series development kit is used to allow users to create and define applications using the Q2686 Refreshed, Q2687 Refreshed, Q26 Elite or Q2698 embedded module.

Interfaces available on the board include:

- External board-to-board connector and TP to access all signals of the embedded module
- Main serial link RS232, UART1* with full signals
  - Ring Indicator
- Auxiliary serial link RS232, UART2* with 4 signals
- High Speed and Full Speed* USB Connectors, compliant with USB 2.0
- SIM* (with SIM presence management)
  - SIM 1.8/3V for the Q2686 Refreshed and Q2687 Refreshed
  - USIM/SIM for the Q2698
  - RUIM for the Q26 Elite (SIM presence management is not available for the Q26 Elite)
- 6-button Keypad
- AUDIO* connectors (AUDIO1, AUDIO2)
- LEDs for several indications
  - Buzzer LED
  - Flash LED
  - Charger LED (except for the Q26 Elite)
- RESET Pushbutton
- Power supply connectors
- ON/OFF switch
- BOOT switch

Note: * *A unique feature of the Q26 Series Development Kit is that each signal's peripherals may be electrically removed independently via special solder. For further details, refer to section 3.2 Special Solder.*

3.2. Special Solder

The PCB print is used for peripherals that are electrically removable.

To connect signals between the embedded module and the dedicated connector on the Q26 Series Development Kit, solder these PCB prints.

To connect signals between the embedded module and the external board connector (J201), it is recommended to avoid soldering these PCB prints (i.e. prototype a daughterboard to connect the embedded module directly through the board connector).

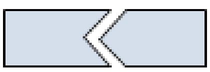


Figure 2. PCB Print

The interfaces listed below are electrically removable via the "special solder":

- UART1 (from J402 to J409)
- UART2 (from J501 to J504)
- AUDIO1 (from J602 to J605)
- AUDIO2 (from J606 to J609)
- SIM (from J701 to J705)
- USB (from J801 to J802)
- Power supply of the Q26 Series Development Kit (all components from J103, except for the embedded module. For further information, refer to section 20 Current Measurement).

3.3. RoHS Compliance

The Q26 series embedded modules and the Q26 Series Development Kit board are compliant with RoHS (Restriction of Hazardous Substances in Electrical and Electronic Equipment) Directive 2002/95/EC, which set limits for the use of certain restricted hazardous substances. This directive states that "from 1st July 2006, new electrical and electronic equipment put on the market does not contain lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE)".

RoHS
COMPLIANT
2002/95/EC

Embedded modules which are compliant with this directive are identified by the RoHS logo on their label.

4. Signal Name Comparison

There are a total of 120 test ports available at the centre of the Q26 Series Development Kit. The following table lists the test port serigraphy and the corresponding signal names of the applicable Q26 series module.

For more information about each signal function and characteristics, refer to the corresponding embedded module document:

- document [2] Product Technical Specification and Customer Design Guidelines for AirPrime Q2686 Refreshed
- document [3] Product Technical Specification and Customer Design Guidelines for AirPrime Q2687 Refreshed
- document [4] AirPrime Q26 Elite Product Technical Specification and Customer Design Guideline
- document [7] Product Technical Specification and Customer Design Guidelines for AirPrime Q2698

Table 1. Q26 Series Development Kit Test Port and Corresponding Embedded Module Signal Name

Test Point Pin Number (T_P)	J200 (Module Board to Board Connector) Pin Number	Test Point Serigraphy	Q2686 Refreshed Signal Name	Q2687 Refreshed Signal Name	Q26 Elite Signal Name	Q2698 Signal Name
1	1-4	VBATT	ADC0/VBATT	ADC0/VBATT	VBATT	VBATT
2	1-4	VBATT	ADC0/VBATT	ADC0/VBATT	VBATT	VBATT
3	6, 8	CHG-IN	CHG-IN	CHG-IN	CHG-IN	NC
4	6, 8	CHG-IN	CHG-IN	CHG-IN	CHG-IN	NC
5	5	VCC_1V8	VCC_1V8	VCC_1V8	VCC_1V8	VCC_1V8
6	10	VCC_2V8	VCC_2V8	VCC_2V8	VCC_2V6	VCC_2V8
7	GND	GND	GND	GND	GND	GND
8	7	BAT-RTC	BAT-RTC	BAT-RTC	VCOIN	BAT-RTC
9	9	SIM-VCC	SIM-VCC	SIM-VCC	UIM-PWR	SIM-VCC
10	12	SIMPRES	SIMPRES	SIMPRES	GPIO2	SIMPRES/GPIO18
11	14	SIM-CLK	SIM-CLK	SIM-CLK	UIM_CLK	SIM-CLK
12	11	SIM-IO	SIM-IO	SIM-IO	UIM_DATA	SIM-IO
13	13	~SIM-RST	~SIM-RST	~SIM-RST	UIM_RESET	~SIM-RST

Test Point Pin Number (T_P)	J200 (Module Board to Board Connector) Pin Number	Test Point Serigraphy	Q2686 Refreshed Signal Name	Q2687 Refreshed Signal Name	Q26 Elite Signal Name	Q2698 Signal Name
14	GND	GND	GND	GND	GND	GND
15	15	BUZZ-OUT	BUZZER0	BUZZER0	VIB_DRV_N	BUZZER0
16	17	FLASH-LED	LED0	LED0	LED	LED0
17	19	ON/~OFF	ON/~OFF	ON/~OFF	ON/~OFF	ON/~OFF
18	21	AUX-ADC	ADC2	ADC2	ADC_1	ADC2
19	18	~RESET	~RESET	~RESET	RESET_N	~RESET
20	16	BOOT	BOOT	BOOT	BOOT	NC
21	20	BAT-TEMP	ADC1/BAT-TEMP	ADC1/BAT-TEMP	ADC_0	ADC1
22	GND	GND	GND	GND	GND	GND
23	24	SPI1-I	SPI1-I	SPI1-I	GPIO34	SPI1-I/GPIO30
24	22	~SPI1-CS	GPIO31/SPI1-Load	GPIO31/SPI1 Load	GPIO32	GPIO31
25	25	SPI1-IO	SPI1-IO	SPI1-IO	GPIO35	SPI1-IO/GPIO29
26	23	SPI1-CLK	SPI1-CLK	SPI1-CLK	GPIO33	SPI1-CLK/GPIO28
27	26	GPIO32	SPI2-CLK	SPI2-CLK	GPIO36	SPI2-CLK/GPIO32
28	28	GPIO35	GPIO35/SPI2-Load	GPIO35/SPI2-Load	GPIO38	GPIO35
29	29	GPIO34	SPI2-I	SPI2-I	GPIO39	SPI2-I/GPIO34
30	27	GPIO33	SPI2-IO	SPI2-IO	GPIO37	SPI2-IO/GPIO33
31	GND	GND	GND	GND	GND	GND
32	30	CT104/RXD2	CT104-RXD2	CT104-RXD2	RXD2	GPIO15/CT104-RXD2
33	32	~CT106/CTS2	~CT106-CTS2	~CT106-CTS2	CTS2	GPIO16/~CT106-CTS2
34	31	CT103/TXD2	CT103-TXD2	CT103-TXD2	TXD2	GPIO14/CT103-TXD2
35	GND	GND	GND	GND	GND	GND
36	33	~CT105/RTS2	~CT105-RTS2	~CT105-RTS2	RTS2	GPIO17/~CT105-RTS2
37	54	USB-DP	USB-DP	USB-DP	USB-DP	USB-DP
38	52	VPAD-USB	VPAD-USB	VPAD-USB	VPAD-USB	VPAD-USB

Test Point Pin Number (T_P)	J200 (Module Board to Board Connector) Pin Number	Test Point Serigraphy	Q2686 Refreshed Signal Name	Q2687 Refreshed Signal Name	Q26 Elite Signal Name	Q2698 Signal Name
39	56	USB-DM	USB-DM	USB-DM	USB-DM	USB-DM
40	GND	GND	GND	GND	GND	GND
41	68	ROW0/GPIO9	ROW0	ROW0	ROW0	GPIO9
42	60	COL1/GPIO5	COL1	COL1	COL1	GPIO5
43	64	ROW4/GPIO13	ROW4	ROW4	ROW4	GPIO13/TX_Burst
44	59	COL0/GPIO4	COL0	COL0	COL0	GPIO4
45	62	COL3/GPIO7	COL3	COL3	COL3	GPIO7
46	61	COL2/GPIO6	COL2	COL2	COL2	GPIO6
47	63	COL4/GPIO8	COL4	COL4	COL4	GPIO8
48	65	ROW3/GPIO12	ROW3	ROW3	ROW3	GPIO12
49	66	ROW2/GPIO11	ROW2	ROW2	ROW2	GPIO11
50	67	ROW1/GPIO10	ROW1	ROW1	ROW1	GPIO10
51	GND	GND	GND	GND	GND	GND
52	GND	GND	GND	GND	GND	GND
53	36	MIC2P	MIC2P	MIC2P	MIC2P	NC
54	35	SPK1P	SPK1P	SPK1P	HPH_OUT_L_P	SPK1P
55	34	MIC2N	MIC2N	MIC2N	MIC2N	NC
56	37	SPK1N	SPK1N	SPK1N	HPH_OUT_R_N	SPK1N
57	40	MIC1P	MIC1P	MIC1P	LINE_IN_L_P	MIC1P
58	39	SPK2P	SPK2P	SPK2P	SPKR_OUT_P	NC
59	38	MIC1N	MIC1N	MIC1N	LINE_IN_R_N	MIC1N
60	41	SPK2N	SPK2N	SPK2N	SPKR_OUT_N	NC
66	1-4	VBATT	ADC0/VBATT	ADC0/VBATT	VBATT	VBATT
67	1-4	VBATT	ADC0/VBATT	ADC0/VBATT	VBATT	VBATT
68	71	CT103/TXD1	CT103-TXD1	CT103-TXD1	TXD1	CT103-TXD1/GPIO36

Test Point Pin Number (T_P)	J200 (Module Board to Board Connector) Pin Number	Test Point Serigraphy	Q2686 Refreshed Signal Name	Q2687 Refreshed Signal Name	Q26 Elite Signal Name	Q2698 Signal Name
69	69	~CT125/RI1	~CT125-RI	~CT125-RI	RI1	~CT125-RI/ GPIO42
70	75	~CT106/CTS1	~CT106-CTS1	~CT106-CTS1	CTS1	~CT106-CTS1/GPIO39
71	73	CT104/RXD1	CT104-RXD1	CT104-RXD1	RXD1	CT104-RXD1/GPIO37
72	72	~CT105/RTS1	~CT105-RTS1	~CT105-RTS1	RTS1	~CT105-RTS1/GPIO38
73	70	~CT109/DCD1	~CT109-DCD1	~CT109-DCD1	DCD1	~CT109-DCD1/GPIO43
74	76	~CT108/DTR1	~CT108-2-DTR1	~CT108-2-DTR1	DTR1	~CT108-2-DTR1/GPIO41
75	74	~CT107/DSR1	~CT107-DSR1	~CT107-DSR1	DSR1	~CT107-DSR1/GPIO40
76	GND	GND	GND	GND	GND	GND
77	GND	GND	GND	GND	GND	GND
78	81	EP-17	Reserved	/OE-R/W	EBI2_OE_N	NC
79	85	EP-0	Reserved	D0	EBI2_AD0	NC
80	89	EP-2	Reserved	D2	EBI2_AD2	NC
81	93	EP-4	Reserved	D4	EBI2_AD4	NC
82	87	EP-1	Reserved	D1	EBI2_AD1	NC
83	97	EP-6	Reserved	D6	EBI2_AD6	GND
84	91	EP-3	Reserved	D3	EBI2_AD3	NC
85	95	EP-5	Reserved	D5	EBI2_AD5	NC
86	99	EP-7	Reserved	D7	EBI2_AD7	GND
87	83	EP-18	Reserved	/CS3	EBI2_CS0_N	GPIO44
88	82	AUX-DAC	Reserved	DAC0	Reserved	GND
89	86	EP-15	Reserved	D15	EBI2_AD15	NC
90	90	EP-13	Reserved	D13	EBI2_AD13	NC
91	94	EP-11	Reserved	D11	EBI2_AD11	NC
92	98	EP-9	Reserved	D9	EBI2_AD9	GND

Test Point Pin Number (T_P)	J200 (Module Board to Board Connector) Pin Number	Test Point Serigraphy	Q2686 Refreshed Signal Name	Q2687 Refreshed Signal Name	Q26 Elite Signal Name	Q2698 Signal Name
93	92	EP-12	Reserved	D12	EBI2_AD12	NC
94	96	EP-10	Reserved	D10	EBI2_AD10	NC
95	100	EP-8	Reserved	D8	EBI2_AD8	GND
96	88	EP-14	Reserved	D14	EBI2_AD14	NC
97	84	EP-16	Reserved	/WE-E	EBI2_WE_N	NC
98	GND	GND	GND	GND	GND	GND
99	GND	GND	GND	GND	GND	GND
100	44	SCL/GPIO26	SCL1	SCL1	SCL	SCL1/GPIO26
101	46	SDA/GPIO27	SDA1	SDA1	SDA	SDA1/GPIO27
102	GND	GND	GND	GND	GND	GND
103	GND	GND	GND	GND	GND	GND
104	79	PCM-CLK	PCM-CLK	PCM-CLK	PCM_CLK	PCM-CLK
105	77	PCM-SYNC	PCM-SYNC	PCM-SYNC	PCM_SYNC	PCM-SYNC
106	80	PCM-OUT	PCM-OUT	PCM-OUT	PCM_DOUT	PCM-OUT
107	78	PCM-IN	PCM-IN	PCM-IN	PCM_DIN	PCM-IN
108	58	GPIO24	GPIO24	GPIO24	GPIO49	GPIO24
109	GND	GND	GND	GND	GND	GND
110	50	INT0/GPIO3	INT0	INT0	GPIO7	INT0/GPIO3
111	48	GPIO20	GPIO20	GPIO20	GPIO43	GPIO20
112	55	GPIO23	GPIO23	GPIO23	GPIO45	GPIO23
113	57	GPIO22	GPIO22	GPIO22	GPIO46	GPIO22
114	51	EP-20	GPIO1	GPIO1	GPIO51	INT2/ GPIO1
115	53	EP-21	GPIO2	GPIO2	GPIO50	GPIO2
116	47	GPIO21	GPIO21	GPIO21	GPIO42	SPI2_CS/GPIO21
117	49	INT1/GPIO25	INT1	INT1	GPIO44	INT1/ GPIO25

Test Point Pin Number (T_P)	J200 (Module Board to Board Connector) Pin Number	Test Point Serigraphy	Q2686 Refreshed Signal Name	Q2687 Refreshed Signal Name	Q26 Elite Signal Name	Q2698 Signal Name
118	43	GPIO44	GPIO0	GPIO0	GPIO40	GPIO0
119	45	GPIO19	GPIO19	GPIO19	GPIO41	SPI1_CS/GPIO19
120	-	NC	N/A	N/A	N/A	N/A
121	42	EP-19	Reserved	A1	EBI2_LB_N	ADC3
122	-	NC	N/A	N/A	N/A	N/A
123	-	NC	N/A	N/A	N/A	N/A
124	-	NC	N/A	N/A	N/A	N/A
125	-	NC	N/A	N/A	N/A	N/A

Aside from the test points mentioned above, there are 8 other test points available on the Q26 Series Development Kit. These test points are connected to the circuitry of the development kit.

Table 2. Additional Test Points

Test Point Pin Number (T_P)	Signal Name	Description
153	VBATT	VBATT power supply
157	VBAT	Refer to sections 6 Power Supply and 6.1 LED Signalization ("VBAT") for more information about the power supply for peripheral components.
200	GND	Ground
201		
202		
203		
400	V_UART	This is the output of the 2.8V Low Dropout Regulator on the Q26 Series Development Kit motherboard for the UART1 RS232 transceiver supply.
500	V_UART_1V8	This is the output of the 1.8V Low Dropout Regulator on the Q26 Series Development Kit motherboard for the UART2 RS232 transceiver supply.

5. External Board Connector (J201) Description

5.1. Q2686 Refreshed, Q2687 Refreshed, Q26 Elite, and Q2698 Signals

All signals of the Q2686 Refreshed, Q2687 Refreshed, Q26 Elite, and Q2698 modules are connected to the external board connector (J201) and are available via TP on the center of the Q26 Series Development Kit. The pin description of the J201 connector is listed in the table below.

For more information about each signal function and their corresponding multiplexes, refer to the corresponding embedded module document:

- document [2] Product Technical Specification and Customer Design Guidelines for AirPrime Q2686 Refreshed
- document [3] Product Technical Specification and Customer Design Guidelines for AirPrime Q2687 Refreshed
- document [4] AirPrime Q26 Elite Product Technical Specification and Customer Design Guideline
- document [7] Product Technical Specification and Customer Design Guidelines for AirPrime Q2698

5.2. External Board Connector (J201)

Table 3. Pin Description of the External Board Connector (J201)

Test Point Pin Number (T_P)	J200 (Module Board to Board Connector) Pin Number	Signal Name	I/O*	I/O Type#	Description
1	1-4	VBATT	I	Supply	Battery Input
2	1-4	VBATT	I	Supply	Battery Input
3	6, 8	CHG-IN	I	Supply	Current source input
4	6, 8	CHG-IN	I	Supply	Current source input
5	5	VCC_1V8	O	Supply	1.8V digital supply output
6	10	VCC_2V8	O	Supply	2.8V digital supply output
7	GND	GND			
8	7	BAT-RTC	I/O	Supply	RTC back-up supply

Test Point Pin Number (T_P)	J200 (Module Board to Board Connector) Pin Number	Signal Name	I/O*	I/O Type#	Description
9	9	SIM-VCC	O	Supply	SIM card supply
10	12	SIMPRES/GPIO18	I	1V8	SIM card detect
11	14	SIM-CLK	O	1V8 / 2V9	SIM clock
12	11	SIM-IO	I/O	1V8 / 2V9	SIM data
13	13	~SIM-RST	O	1V8 / 2V9	SIM reset
14	GND	GND			
15	15	BUZZ-OUT	O	Open Drain	PWM/Buzzer output
16	17	FLASH-LED	O	Open Drain	Charging indicator
17	19	ON/ ~OFF	I	VBATT	Embedded Module Power ON
18	21	AUX-ADC	I	Analog	Auxiliary ADC
19	18	~RESET	I/O	1V8	Embedded Module Reset
20	16	BOOT	I	1V8	SW download (with Sierra Wireless software "DWLwin")
21	20	BAT-TEMP	I	Analog	ADC input for battery temperature measurement
22	GND	GND			
23	24	SPI1-I/GPIO30	I	2V8	SPI1 Serial input (Multiplexed)
24	22	~SPI1-CS/GPIO31	O	2V8	SPI1 Enable (Multiplexed)
25	25	SPI1-IO/GPIO29	I/O	2V8	SPI1 Serial input/output (Multiplexed)
26	23	SPI1-CLK/GPIO28	O	2V8	SPI1 Serial Clock (Multiplexed)
27	26	SPI2-CLK/GPIO32	O	2V8	SPI2 Serial Clock (Multiplexed)
28	28	SPI2-CS/GPIO35	O	2V8	SPI2 Enable (Multiplexed)
29	29	SPI2-I/GPIO34	I	2V8	SPI2 Serial input (Multiplexed)
30	27	SPI2-IO/GPIO33	I/O	2V8	SPI2 Serial input/output (Multiplexed)
31	GND	GND			
32	30	CT104-RXD2/GPIO15	O	1V8	Auxiliary RS232 Receive Serial Data (According to PC view and Multiplexed)

Test Point Pin Number (T_P)	J200 (Module Board to Board Connector) Pin Number	Signal Name	I/O*	I/O Type#	Description
33	32	~CT106-CTS2/GPIO16	O	1V8	Auxiliary RS232 Clear To Send (According to PC view and Multiplexed)
34	31	CT103-TXD2/GPIO14	I	1V8	Auxiliary RS232 Transmit Serial Data (According to PC view and Multiplexed)
35	GND	GND			
36	33	~CT105-RTS2/GPIO17	I	1V8	Auxiliary RS232 Request To Send (According to PC view and Multiplexed)
37	54	USB-DP	I/O	3V3	Differential data interface positive
38	52	VPAD-USB	I	3V3	USB power supply
39	56	USB-DM	I/O	3V3	Differential data interface negative
40	GND	GND			
41	68	ROW0/GPIO9	I/O	1V8	Row scan (Multiplexed)
42	60	COL1/GPIO5	I/O	1V8	Column scan (Multiplexed)
43	64	ROW4/GPIO13	I/O	1V8	Row scan (Multiplexed)
44	59	COL0/GPIO4	I/O	1V8	Column scan (Multiplexed)
45	62	COL3/GPIO7	I/O	1V8	Column scan (Multiplexed)
46	61	COL2/GPIO6	I/O	1V8	Column scan (Multiplexed)
47	63	COL4/GPIO8	I/O	1V8	Column scan (Multiplexed)
48	65	ROW3/GPIO12	I/O	1V8	Row scan (Multiplexed)
49	66	ROW2/GPIO11	I/O	1V8	Row scan (Multiplexed)
50	67	ROW1/GPIO10	I/O	1V8	Row scan (Multiplexed)
51	GND	GND			
52	GND	GND			
53	36	MIC2P	I	Analog	Microphone 2 positive input
54	35	SPK1P	O	Analog	Speaker 1 positive output
55	34	MIC2N	I	Analog	Microphone 2 negative input
56	37	SPK1N	O	Analog	Speaker 1 negative output

Test Point Pin Number (T_P)	J200 (Module Board to Board Connector) Pin Number	Signal Name	I/O*	I/O Type#	Description
57	40	MIC1P	I	Analog	Microphone 1 positive input
58	39	SPK2P	O	Analog	Speaker 2 positive output
59	38	MIC1N	I	Analog	Microphone 1 negative input
60	41	SPK2N	O	Analog	Speaker 2 negative output
61	-	NC			Not connected
62	-	NC			Not connected
63	-	NC			Not connected
64	-	NC			Not connected
65	-	NC			Not connected
66	1-4	VBATT	I	Supply	Battery Input
67	1-4	VBATT	I	Supply	Battery Input
68	71	CT103-TXD1/GPIO36	I	2V8	Main RS232 Transmit Serial Data (According to PC view and Multiplexed)
69	69	~CT125-RI1/GPIO42	O	2V8	Main RS232 Ring indicator (According to PC view and Multiplexed)
70	75	~CT106-CTS1/GPIO39	O	2V8	Main RS232 Clear To Send (According to PC view and Multiplexed)
71	73	CT104-RXD1/GPIO37	O	2V8	Main RS232 Receive Serial Data (According to PC view and Multiplexed)
72	72	~CT105-RTS1/GPIO38	I	2V8	Main RS232 Request To Send (According to PC view and Multiplexed)
73	70	~CT109-DCD1/GPIO43	O	2V8	Main RS232 Data Carrier Detect (According to PC view and Multiplexed)
74	76	~CT108-2-DTR1/GPIO41	I	2V8	Main RS232 Data Terminal Ready (According to PC view and Multiplexed)
75	74	~CT107-DSR1/GPIO40	O	2V8	Main RS232 Data Set Ready (According to PC view and Multiplexed)
76	GND	GND			

Test Point Pin Number (T_P)	J200 (Module Board to Board Connector) Pin Number	Signal Name	I/O*	I/O Type#	Description
77	GND	GND			
78	81	EP17			Depending on the Q26 series embedded module**
79	85	EP0			Depending on the Q26 series embedded module**
80	89	EP2			Depending on the Q26 series embedded module**
81	93	EP4			Depending on the Q26 series embedded module**
82	87	EP1			Depending on the Q26 series embedded module**
83	97	EP6			Depending on the Q26 series embedded module**
84	91	EP3			Depending on the Q26 series embedded module**
85	95	EP5			Depending on the Q26 series embedded module**
86	99	EP7			Depending on the Q26 series embedded module**
87	83	EP18			Depending on the Q26 series embedded module**
88	82	AUX-DAC	O	2V3	Digital to Analog Output; depending on the Q26 series embedded module**
89	86	EP15			Depending on the Q26 series embedded module**
90	90	EP13			Depending on the Q26 series embedded module**
91	94	EP11			Depending on the Q26 series embedded module**
92	98	EP9			Depending on the Q26 series embedded module**
93	92	EP12			Depending on the Q26 series embedded module**
94	96	EP10			Depending on the Q26 series embedded module**
95	100	EP8			Depending on the Q26 series embedded module**
96	88	EP14			Depending on the Q26 series embedded module**
97	84	EP16			Depending on the Q26 series embedded module**
98	GND	GND			
99	GND	GND			
100	44	SCL/GPIO26	I/O	Open drain	Serial Clock/General purpose input-output
101	46	SDA/GPIO27	I/O	Open drain	Serial Data/General purpose input-output

Test Point Pin Number (T_P)	J200 (Module Board to Board Connector) Pin Number	Signal Name	I/O*	I/O Type#	Description
102	GND	GND			
103	GND	GND			
104	79	PCM-CLK	O	1V8	Data clock
105	77	PCM-SYNC	O	1V8	Frame synchronization 8KHz
106	80	PCM-OUT	O	1V8	Data output
107	78	PCM-IN	I	1V8	Data input
108	58	GPIO24***	I/O	2V8	General purpose input/output
109	GND	GND			
110	50	INT0/GPIO3***	I/O	1V8	Interruption 0/General purpose input-output
111	48	GPIO20***	I/O	2V8	General purpose input/output
112	55	GPIO23***	I/O	2V8	General purpose input/output
113	57	GPIO22***	I/O	2V8	General purpose input/output
114	51	EP20	I/O	1V8	Depending on the Q26 series embedded module**
115	53	EP21	I/O	1V8	Depending on the Q26 series embedded module**
116	57	GPIO21***	I/O	2V8	General purpose input/output
117	49	INT1/ GPIO25***	I/O	2V8	Interruption 1/General purpose input-output
118	43	GPIO44***	I/O	2V8	General purpose input/output
119	45	GPIO19***	I/O	2V8	General purpose input/output
120	-	NC			Not connected
121	42	EP19	I/O	1V8	Depending on the Q26 series embedded module**
122	-	NC			Not connected
123	-	NC			Not connected
124	-	NC			Not connected
125	-	NC			Not connected
126	-	NC			Not connected
127	-	NC			Not connected

Test Point Pin Number (T_P)	J200 (Module Board to Board Connector) Pin Number	Signal Name	I/O*	I/O Type#	Description
128	-	NC			Not connected
129	-	NC			Not connected
130	-	NC			Not connected

* According to the embedded module view.

** Refer to Figure 1 Q26 Series Development Kit – Top View.

*** The GPIO index varies depending on the Q26 series module used. The GPIO index specified in the table above was based on the Q26xx Refreshed embedded modules. Please refer to section 4 Signal Name Comparison for the GPIO index used with the Q26 Elite and Q2698.

The I/O type and voltage level depends on the Q26 series embedded module used. For more information, refer to documents [2] AirPrime Q2686 Refreshed Product Technical Specification and Customer Design Guideline, [3] AirPrime Q2687 Refreshed Product Technical Specification and Customer Design Guideline, [4] AirPrime Q26 Elite Product Technical Specification and Customer Design Guideline, and [7] Product Technical Specification and Customer Design Guidelines for AirPrime Q2698.

6. Power Supply

Two power supply sources are available to start the Q26 Series Development Kit:

- DC external supply (via J100)
- AC/DC adapter (via J101)

These power supplies are protected by a transient voltage suppressor.

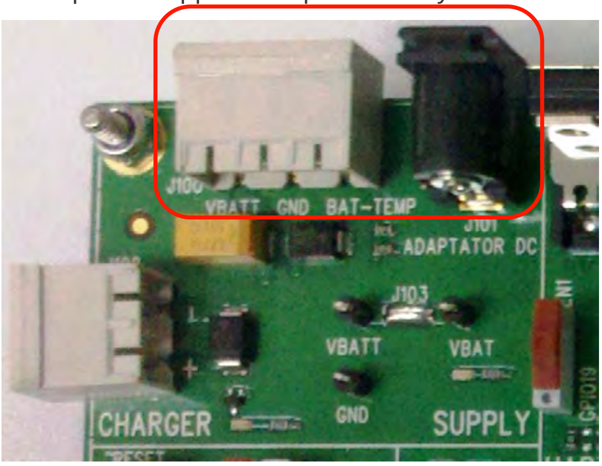


Figure 3. Power Supply Voltage (J100 and J101)

Each of these power supplies are used for both the embedded module and the peripherals on the Q26 Series Development Kit.

It is possible to separate the power supply for the embedded module ("VBATT", measurable via the TP153) and for the peripherals ("VBAT", measurable via the TP157).



Figure 4. Zoom on "J103"

Current measurement is possible between VBATT and VBAT via J103 (for more information, refer to section 21 Current Measurement.

6.1. LED Signalization ("VBAT")

The "VBAT" indicator is a green LED and it indicates the presence of an external power supply. Both the embedded module and the peripherals may be powered by the VBAT power source.

Table 4. LED of "VBAT"

LED	VBATT	VBAT
Light ON	ON	ON
Light OFF*	Can be ON	OFF

* If the special solder, J103, is not soldered, an extra external power supply must be used. Note that it is recommended to always use both VBATT and VBAT simultaneously.

6.2. External Supply

The J100 connector has three contacts:

- **J100: Pins 1-2** are used for the power supply.
- **J100: Pins 2-3** are used to plug in BAT-TEMP. Refer to section 6.3 BAT-TEMP for more information.

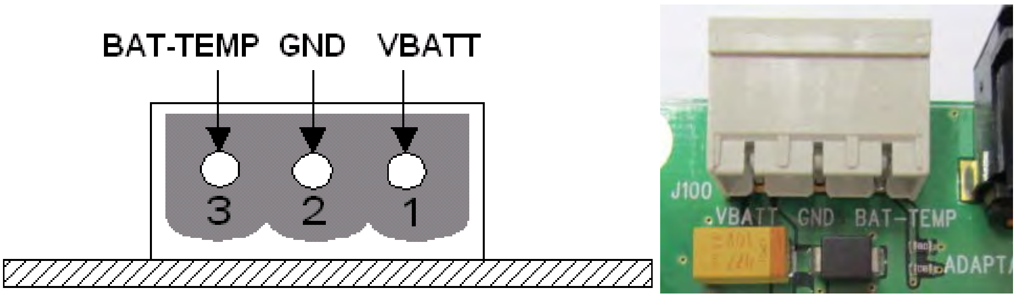


Figure 5. Power Supply Voltage

Table 5. Electrical Characteristics of VBAT

	Q26 Embedded Module	V_{MIN}	V_{NOM}	V_{MAX}
VBATT[1,2]	Q2686 Refreshed, Q2687 Refreshed	3.2V	3.6V	4.8V
	Q26 Elite	3.8V	4.0V	4.2V
	Q2698	3.4V	3.8V	4.2V

1 This value has to be maintained during the burst (with 2.0A Peak in GSM, GPRS, and EDGE mode)

2 Maximum operating Voltage Stationary Wave Ratio (VSWR) is 2:1.

6.3. BAT-TEMP

This signal acts as an input (ADC) to the embedded module.

J100: Pins 2-3 also allows simulation of the temperature level by a sensor inside the battery.

Table 6. Electrical Characteristics of BAT-TEMP

	Q26 Embedded Module	V_{MIN}	V_{NOM}	V_{MAX}
BAT-TEMP	Q2686 Refreshed, Q2687 Refreshed	0	-	2V
	Q26 Elite			2.1V

For more information, refer to the following documents:

- document [2] Product Technical Specification and Customer Design Guidelines for AirPrime Q2686 Refreshed
- document [3] Product Technical Specification and Customer Design Guidelines for AirPrime Q2687 Refreshed
- document [4] AirPrime Q26 Elite Product Technical Specification and Customer Design Guideline

6.4. Main Supply Adapter

The J101 connector powers the Q26 Series Development Kit using the AC power supply cable.



Figure 6. Main Supply Adapter

The only supported adapter is listed in the table below.

Table 7. Main Supply Adapter Reference

Manufacturer	Reference	Characteristics
SINPRO	SPU12C-101	4V DC/2.5 A

7. Charger Supply and LED

7.1. Charger Supply

The Q26 Series Development Kit supports a battery charging interface. Use J102 to connect to this interface.

This power supply is protected by a transient voltage suppressor.

Note:	*When the charger is used, the battery must be connected.*

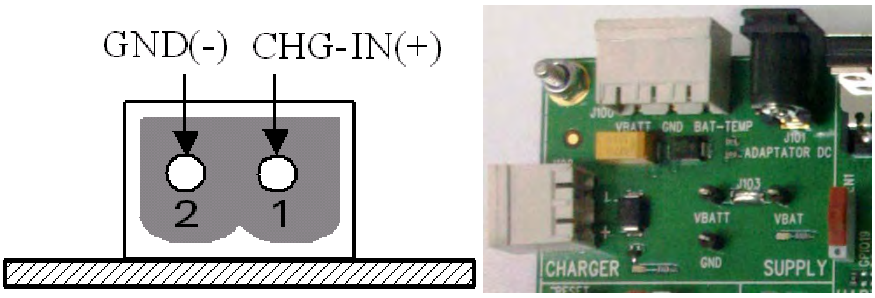


Figure 7. Charger Supply

Table 8. Power Supply Voltage

	Q26 Embedded Module	V_{MIN}	V_{NOM}	V_{MAX}
CHG-IN Voltage (for $I=I_{max}$)	Q2686 Refreshed and Q2687 Refreshed	4.6V*		6V
	Q26 Elite	4.5V	4.7V	4.9V

* Parameters are set as per battery manufacturer.

7.2. LED Signalization ("CHARGER")

The "CHARGER" LED location is shown in the following figure.

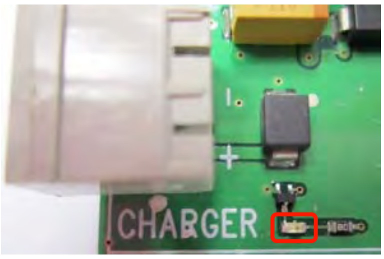


Figure 8. Charger LED Location

The "CHARGER" indicator is a red LED wired on GPIO21. This LED represents the logic level of GPIO21.

The Open AT Framework may be used to manage charging through AT commands. For more information, refer to documents [6] Open AT Framework AT Commands Interface Guide for Firmware 7.50 and [7] AirPrime Q26Elite User Guide & AT Commands Interface Specification.

Note:	*The charger indicator feature is not available for the Q26 Elite embedded module.*

8. Flash LED ("FLASH-LED")

The "FLASH-LED" location is shown in the following figure:



Figure 9. FLASH-LED Location

This LED works in two modes:

- The embedded module is in **OFF state**: The "FLASH-LED" blinks in pre-charging mode (via the J102 connector).
- The embedded module is in **ON state**: The "FLASH-LED" indicates the network status.

Note: This feature is available in all variants of the Q2686 Refreshed, Q2687 Refreshed, and Q2698 embedded modules; but only available for the Q26 Elite embedded module with R5A Firmware or later.

For more information, refer to the following documents:

- document [2] Product Technical Specification and Customer Design Guidelines for AirPrime Q2686 Refreshed
- document [3] Product Technical Specification and Customer Design Guidelines for AirPrime Q2687 Refreshed
- document [4] AirPrime Q26 Elite Product Technical Specification and Customer Design Guideline
- document [7] Product Technical Specification and Customer Design Guidelines for AirPrime Q2698

9. Buzzer LED ("BUZZ-OUT")

The "BUZZ-OUT" LED location is shown in the following figure:

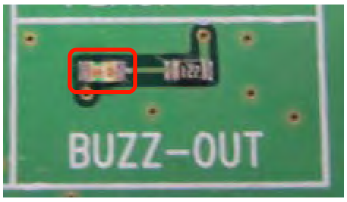


Figure 10. BUZZ-OUT Location

The "BUZZ-OUT" indicator is a yellow LED controlled by the Buzzer signal of the Q26 Series embedded modules. It is driven by a "PWM" signal (open drain).

For more information, refer to the following documents:

- document [2] Product Technical Specification and Customer Design Guidelines for AirPrime Q2686 Refreshed
- document [3] Product Technical Specification and Customer Design Guidelines for AirPrime Q2687 Refreshed
- document [4] AirPrime Q26 Elite Product Technical Specification and Customer Design Guideline
- document [7] Product Technical Specification and Customer Design Guidelines for AirPrime Q2698

10. Control Functions

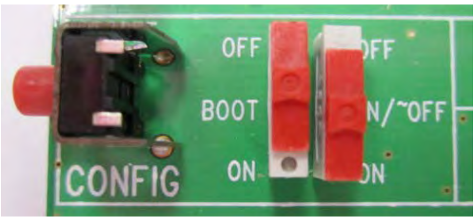


Figure 11. Switches Configuration

10.1. ON/~OFF

Once the Q26 Series Development Kit is connected to an external source (via J100 or J101), the ON/~OFF switch can provide power through VBATT to the embedded module when it is "ON".

After 1 second, this switch can be switched off.

For more information, refer to the following documents:

- document [2] Product Technical Specification and Customer Design Guidelines for AirPrime Q2686 Refreshed
- document [3] Product Technical Specification and Customer Design Guidelines for AirPrime Q2687 Refreshed
- document [4] AirPrime Q26 Elite Product Technical Specification and Customer Design Guideline
- document [7] Product Technical Specification and Customer Design Guidelines for AirPrime Q2698

10.2. ~RESET

The ~RESET pushbutton starts a general reset when it is pushed.

Note: *An operating system reset is preferred to a hardware reset.*

10.3. BOOT

The BOOT switch is only used to download new software to the embedded module via UART1, with the specific download software provided by Sierra Wireless.

Under normal conditions, it must be in the "OFF" position.

Table 9. BOOT Configuration

Mode	BOOT	ON/~OFF
Normal	OFF	ON
Back-up download with specific download software	ON	ON

11. Keypad Function

Only 6 keypads are connected on the Q26 Series Development Kit, as shown in the figure below.

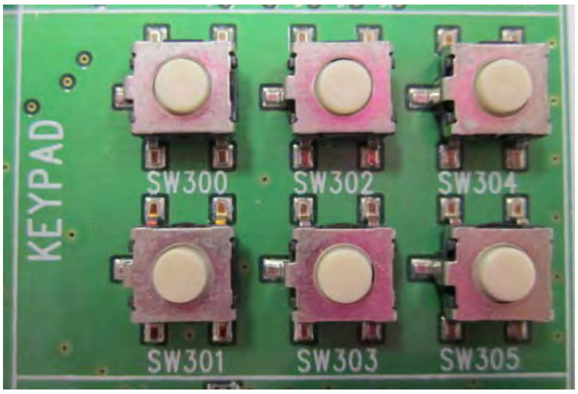


Figure 12. Keypad Configuration

Each switch on the keypad corresponds to a row and column signal on the embedded module. For example, if the key SW300 is pressed, an electric detection will be made on ROW0 and COL0.

Refer to the following table for the keyboard matrix.

Table 10. Keyboard Matrix

	COL0	COL1	COL2	COL3	COL4
ROW0	SW300	-	-	-	-
ROW1	-	SW301	-	-	-
ROW2	-	-	SW302	-	-
ROW3	-	-	-	SW303	SW304
ROW4	-	-	-	-	SW305

12. UART1 Function

The UART1 function is the main RS232 serial link of the embedded module on the Q26 Series Development Kit. The voltage level of UART1 is 2.8V for the Q2686 Refreshed, Q2687 Refreshed, and Q2698; and 2.6V for the Q26 Elite.

This function may be electrically detached with special solder (unsoldered J402 to J409). Unsoldering J402 to J409 allows UART1 signals to transmit via the external connector at J201.

By default, the UART1 is available on its dedicated connector, J400 (J402 to J409 soldered).

12.1. UART1 Connector (J400)

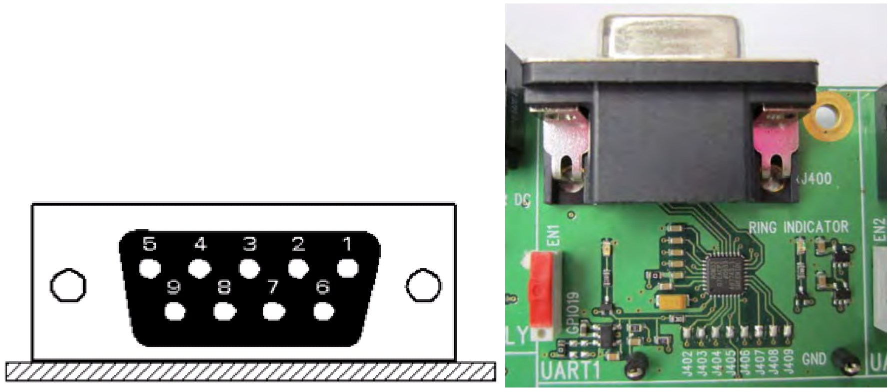


Figure 13. Enable UART1 Connector

J400 is a SUB-D 9-pin female connector. Refer to the following table for the UART1 connector pin description.

Table 11. Pin Description of the UART1 Connector

Pin #	Signal Name	I/O	I/O Type	Description
1	CT109 DCD	O	RS232 (V24/V28)	Data Carrier Detect
2	CT104 RXD	O	RS232 (V24/V28)	Receive serial data
3	CT103 TXD	I	RS232 (V24/V28)	Transmit serial data
4	CT108-2 DTR	I	RS232 (V24/V28)	Data Terminal Ready
5	GND			Ground
6	CT107 DSR	O	RS232 (V24/V28)	Data Set Ready
7	CT105 RTS	I	RS232 (V24/V28)	Request To Send
8	CT106 CTS	O	RS232 (V24/V28)	Clear To Send
9	CT125 RI	O	RS232 (V24/V28)	Ring Indicator

12.2. UART1 Configuration

The Q26 Series Development Kit acts as a DCE and is connected to a DTE (PC or terminal) with a "straight cable". This is a full UART.

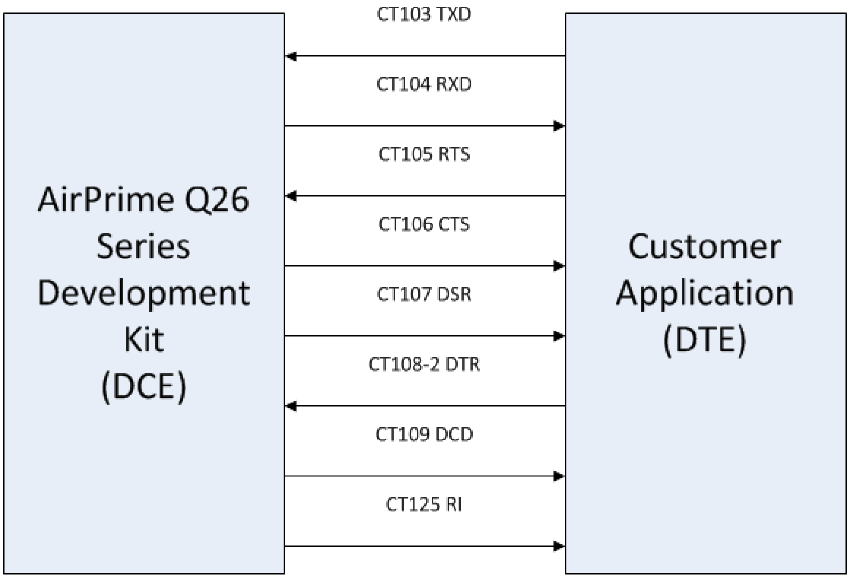


Figure 14. RS232 Main Serial Link

12.3. Enable UART1 ("EN1/GPIO19")

A switch, "EN1/GPIO19", may enable the shutdown mode of the RS232 transceiver. By default, the RS232 transceiver is in active mode (switch to "EN1").

For other cases, the Open AT Framework allows customers to enable the shutdown mode by using GPIO19 for the Q2686 Refreshed, Q2687 Refreshed, and Q2698; and GPIO41 for the Q26 Elite.

Table 12. Enable UART1 Configuration

<table>
<tr><th colspan="2">Switch “EN1/GPIO19”</th><th>UART1</th><th>LED “EN1”</th></tr>
<tr><td colspan="2">EN1</td><td>ON (in hardware)</td><td>ON</td></tr>
<tr><td rowspan="2">• GPIO19 (for the Q2686 Refreshed, Q2687 Refreshed, and Q2698)
• GPIO41 (for the Q26 Elite)</td><td>0L</td><td>ON</td><td>ON</td></tr>
<tr><td>1L</td><td>OFF</td><td>OFF</td></tr>
</table>

Note: GPIO19 is multiplexed with SPI1_CS, and GPIO1 is multiplexed with INT2. If the transceiver has to be enabled or disabled by GPIO, the SPI1_CS or INT2 function must first be disabled before using GPIO AT commands to enable or disable the transceiver.

For more information about the corresponding embedded module signal names, refer to section 4 Signal Name Comparison.

12.4. LED Signalization

12.4.1. LED "RING INDICATOR"

The "RING INDICATOR" is a yellow LED controlled by the ~CT125-RI1/GPIO42 signal provided by the embedded module.

It is possible to activate a «visual» mode using AT commands. Use **AT+WRIM=0** when using the Q2686 Refreshed, Q2687 Refreshed or Q2698; **WWAKE**, **WWAKESET** and **WRID** when using the Q26 Elite. For more information about these AT commands, refer to documents [6] Open AT Framework AT Commands Interface Guide for Firmware 7.50 and [7] AirPrime Q26Elite User Guide & AT Commands Interface Specification.

When the embedded module receives an incoming call, this signal goes from high to low for 0.5 seconds alternately, hence making the LED indicator “blink”.

12.4.2. LED "EN1"

The "EN1" indicator is a green LED controlled by the EN1, GPIO19 or GPIO41 signals provided by the embedded module. (Refer to section 4 Signal Name Comparison for more information about the signal name differences between the embedded modules.)

The "EN1" LED lights up when the RS232 transceiver is operational (refer to the configuration in Table 12 Enable UART1 Configuration).

13. UART2 Function

The UART2 function is an auxiliary RS232 serial link of the embedded module on the Q26 Series Development Kit. The voltage level of UART2 is 1.8V.

This function may be electrically detached with special solder (unsoldered J501 to J504). Unsoldering J501 to J504 allows UART2 signals to transmit via the external connector at J201.

By default, the UART2 is available on its dedicated connector, J500 (J501 to J504 soldered).

13.1. UART2 Connector (J500)

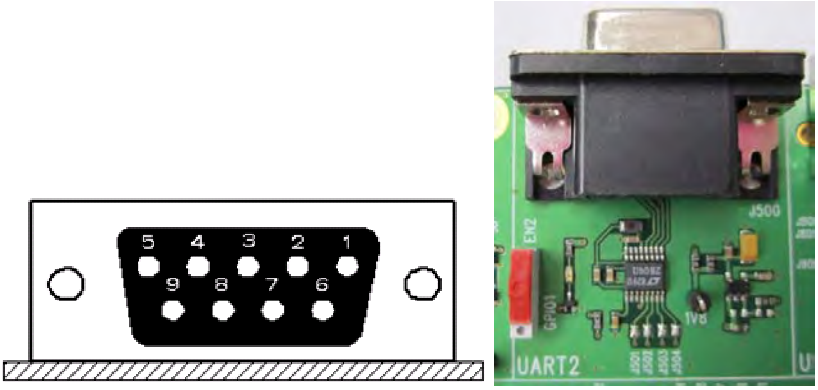


Figure 15. Enable UART2 Configuration

J500 is a SUB-D 9-pin female connector. Refer to the following table for the UART2 connector pin description.

Table 13. Pin Description of the UART2 Connector

Pin #	Signal Name	I/O	I/O Type	Description
1	Not used*	-	-	-
2	CT104 RXD	O	RS232 (V24/V28)	Receive serial data
3	CT103 TXD	I	RS232 (V24/V28)	Transmit serial data
4	Not used*	-	-	-
5	GND			Ground
6	Not used*	-	-	-
7	CT105 RTS	I	RS232 (V24/V28)	Request To Send
8	CT106 CTS	O	RS232 (V24/V28)	Clear To Send
9	Not used*	-	-	-

* Only 4 signals are used.

13.2. UART2 Configuration

The Q26 Series Development Kit acts as a DCE and is connected to a DTE (PC or terminal) with a "straight cable". Note that there are only 4 signals on UART2.

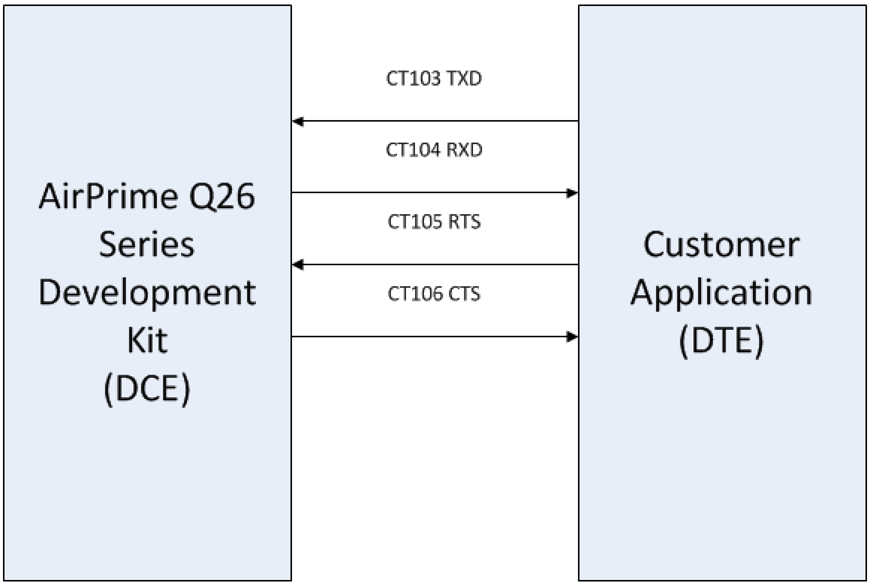


Figure 16. RS232 Auxiliary Serial Link

13.3. Enable UART2 ("EN2/GPIO1")

A switch, "EN2/GPIO1", may enable the shutdown mode of the RS232 transceiver. By default, the RS232 transceiver is in active mode (switch to "EN2").

For other cases, the Open AT Framework allows customer to enable the shutdown mode by using GPIO1 for the Q2686 Refreshed, Q2687 Refreshed, and Q2698; and GPIO51 for the Q26 Elite.

Table 14. Enable UART2 Configuration

Switch "EN2/GPIO1"		UART1	LED "EN1"
EN2		ON (in hardware)	ON
• GPIO1 (for the Q2686 Refreshed, Q2687 Refreshed, and Q2698) • GPIO51 (for the Q26 Elite)	1L	ON	ON
	0L	OFF	OFF

For more information about the corresponding embedded module signal names, refer to section 4 Signal Name Comparison.

13.4. LED Signalization ("EN2")

The "EN2" indicator is a green LED controlled by EN2, GPIO1 or GPIO51 signals provided by the embedded module. (Refer to section 4 Signal Name Comparison for more information about the signal name differences between the embedded modules.)

The "EN2" LED lights up when the RS232 transceiver is operational (see the configuration in Table 14 Enable UART2 Configuration).

14. SIM Function

14.1. SIM Connector (J700)

J700 is a standard 1V8 or 3V SIM socket.

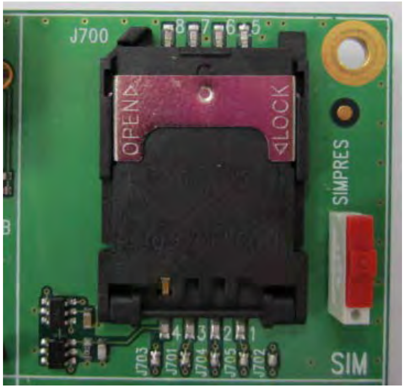


Figure 17. SIM Connector

Refer to the following table for the SIM connector pin description.

Table 15. Pin Description of the SIM Connector

Pin #	Signal Name	I/O	I/O Type	Description	Comment
1	SIM-VCC	O	1V8 or 3V	SIM Power Supply	
2	SIM-RST	O	1V8 or 3V	SIM Reset	
3	SIM-CLK	O	1V8 or 3V	SIM Clock	
4	SIMPRES	I	1V8 max*	SIM Card Detect	Multiplexed with GPIO18 for the Q2686 Refreshed, Q2687 Refreshed, and Q2698; N/A for the Q26 Elite.
5	GND			Ground	
6	VPP	Not connected			
7	SIM_DATA	I/O	1V8 or 3V	SIM Data	
8	CC8		1V8	SIMPRES signal supply	N/A for the Q26 Elite.

* Either for 1V8 or 3V SIM cards.

The SIM interface controls both 3V and 1.8V SIM cards. This function may be electrically detached with special solder (unsoldered J701 to J705). Unsoldering J701 to J705 allows SIM signals to transmit via the external connector at J201.

By default, the SIM signals are available on its dedicated connector, J700 (J701 to J705 soldered).

ESD protections are used on the 5 SIM signals.

The signal SIMPRES also presents the following options:

- If the SIMPRES signal is used by the application (detection of SIM card presence by the SIM socket), the "SIMPRES" switch must be moved to "SIMPRES" (contact 1-2 used).
- Otherwise, to simulate a SIM card presence at all times (without the SIM socket), the "SIMPRES" switch must be moved to other side (contact 2-3 used).

Note: SIMPRES is not available for the Q26 Elite embedded module.

Table 16. SIMPRES Configuration

Switch “SIMPRES”	SIM Card Presence
SIMPRES	Depends on the presence of a real SIM
Other side	Simulates the presence of a SIM

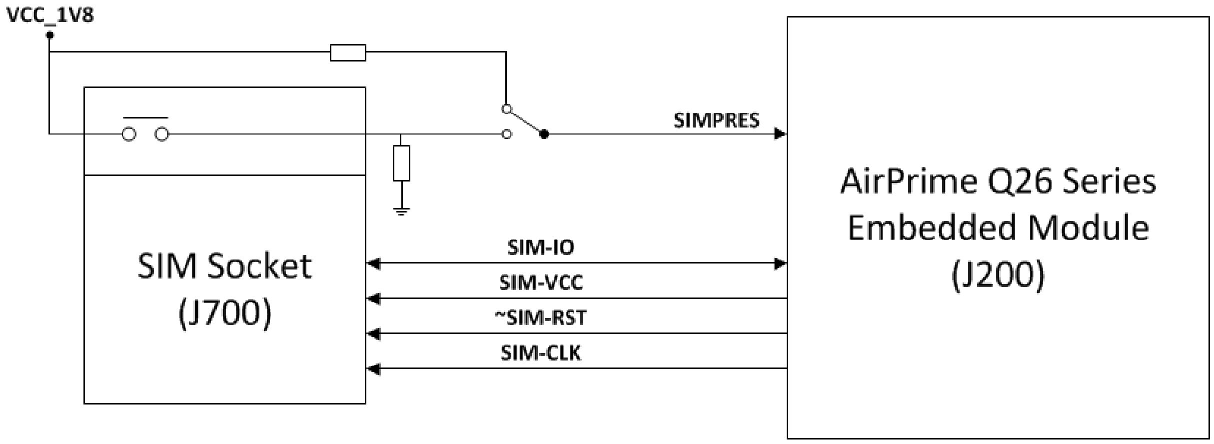


Figure 18. Schematic Diagram of the Switch “SIMPRES”

15. USB Function

Both High Speed USB (J804) and Full Speed USB (J800) are supported. The default USB connection is J804 (High Speed).

ESD protections are used on the 2 USB signals.

15.1. High Speed USB Connector (J804)

J804 is a USB Series type B receptacle; and it is the default USB connection on the development kit.

By default, (High Speed) USB signals are available on its dedicated connector, J804 (with J805 to J806 soldered).

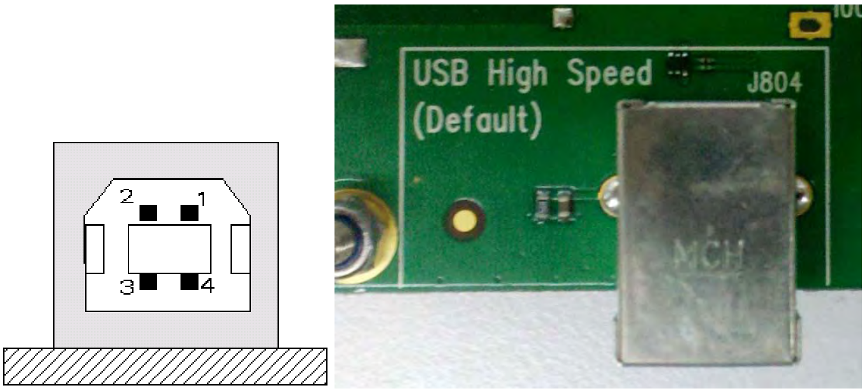


Figure 19. High Speed USB Connector

Refer to the following table for the High Speed USB connector pin description.

Table 17. Pin Description of the High Speed USB Connector

Pin #	Signal Name	I/O	I/O Type	Description
1	VBUS	I	Power supply	+ 5 VDC
2	DM	I/O	Digital	USB negative line
3	DP	I/O	Digital	USB positive line
4	GND		Power supply	Ground
Shell	Shielding			

15.2. Full Speed USB Connector (J800)

J800 is a USB Series type B receptacle; and it is an optional USB connection on the development kit.

By default, (Full Speed) USB signals are available on its dedicated connector, J800 (with J801 to J802 soldered). This function may be electrically removed with special solder (unsoldered J801 to J802). Unsoldering J801 to J802 allows for the transmission of undisturbed signals via the external connector (J201).

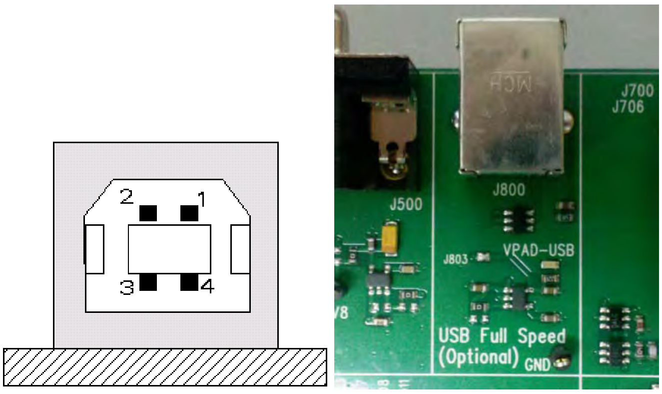


Figure 20. Full Speed USB Connector

Refer to the following table for the Full Speed USB connector pin description.

Table 18. Pin Description of the Full Speed USB Connector

Pin #	Signal Name	I/O	I/O Type	Description
1	VBUS	I	Power supply	+ 5 VDC
2	DM	I/O	Digital	USB negative line
3	DP	I/O	Digital	USB positive line
4	GND		Power supply	Ground
Shell	Shielding			

Note: *Although the Q2698 embedded module supports both High Speed and Full Speed USB, it is recommended to always use the High Speed USB connector (J804) when using a Q2698 embedded module. Using the Full Speed USB connector (J800) with a Q2698 embedded module may cause the embedded module to function irregularly.*

15.3. LED Signalization ("VPAD-USB")

The "VPAD-USB" indicator is a green LED controlled by the presence of VBUS (when the plug is in either USB connector).

The power supply for the USB interface in the embedded module is provided by the USB connector. When a USB cable is plugged in, the LED light and VPAD-USB (the output of a regulator – LDO) is at 3.3V.

A special solder (J803) must be soldered to power the USB interface in the embedded module. This special solder, J803, is soldered by default.

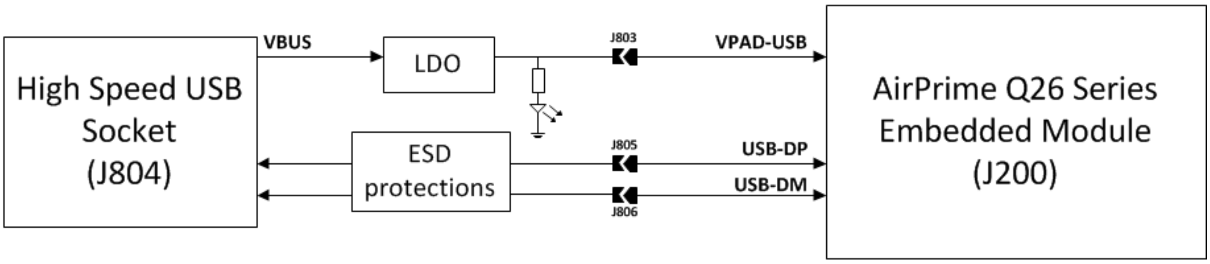


Figure 21. High Speed USB Electrical Diagram

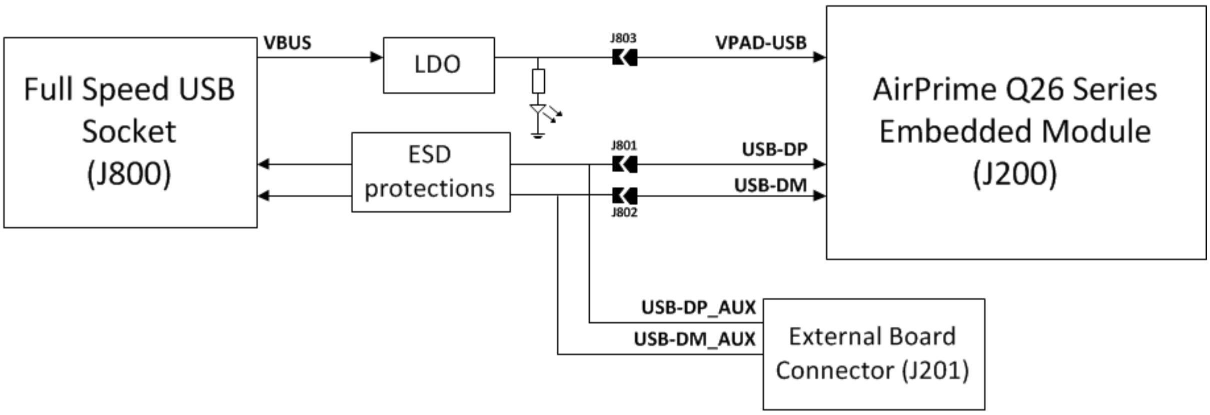


Figure 22. Full Speed USB Electrical Diagram

16. AUDIO Functions

There are 2 AUDIO interfaces in the Q26 Series Development Kit.

16.1. AUDIO1 Connector (J601)

J601 is an RJ9 4-pin Connector.

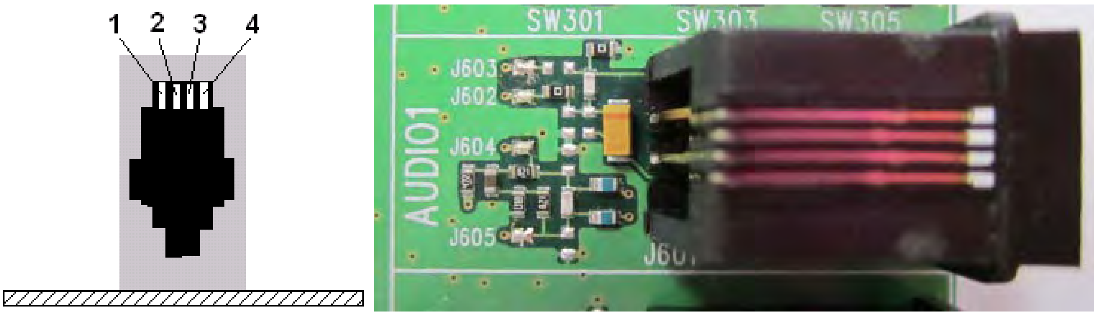


Figure 23. AUDIO1 Connector

Refer to the following tables for the AUDIO1 connector signal pin description.

Table 19. Pin Description of the AUDIO1 Connector (for the Q2686 Refreshed, Q2687 Refreshed, and Q2698 embedded modules)

Pin #	Signal Name	I/O	I/O Type	Description
1	MIC1N	I	Analog	Auxiliary microphone negative input
2	SPK1N	O	Analog	Auxiliary speaker negative output
3	SPK1P	O	Analog	Auxiliary speaker positive output
4	MIC1P	I	Analog	Auxiliary microphone positive input

Table 20. Pin Description of the AUDIO1 Connector (for the Q26 Elite embedded module)

Pin #	Signal Name	I/O	I/O Type	Description
1	LINE_IN_R_N	I	Analog	Microphone 1 negative input
2	HPH_OUT_R_N	O	Analog	Speaker 1 negative output
3	HPH_OUT_L_P	O	Analog	Speaker 1 positive output
4	LINE_IN_L_P	I	Analog	Microphone 1 positive input

Note: *In order to get better audio performance with the AirPrime Q2698 embedded module, move the resistor from R605 to R604 (marked in Figure 24).*

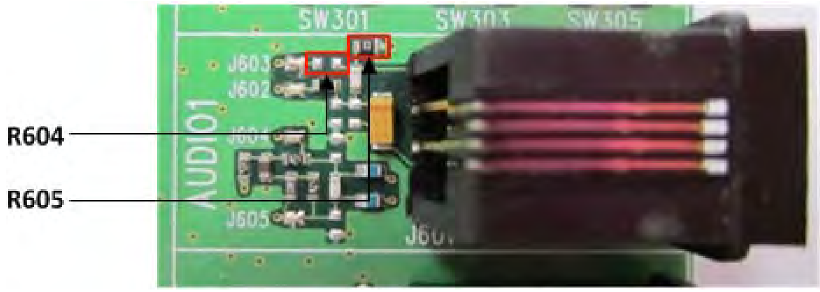


Figure 24. R604 and R605 Placement

16.2. AUDIO2 Connector (J600)

Note: This interface is not supported by the Q2698 embedded module.

J600 is an RJ9 4-pin connector.

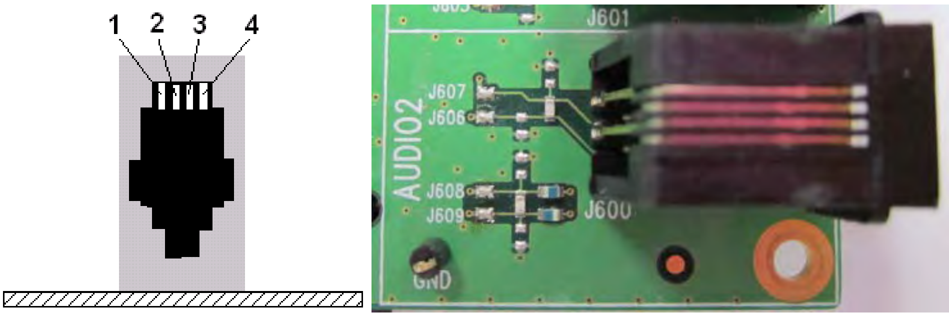


Figure 25. AUDIO2 Connector

Refer to the following tables for the AUDIO2 connector signal pin description.

Table 21. Pin Description of the AUDIO2 Connector (for the Q2686 Refreshed, Q2687 Refreshed and embedded modules)

Pin #	Signal Name	I/O	I/O Type	Description
1	MIC2N	I	Analog	Main microphone negative input
2	SPK2N	O	Analog	Main speaker negative output
3	SPK2P	O	Analog	Main speaker positive output
4	MIC2P	I	Analog	Main microphone positive input

Table 22. Pin Description of the AUDIO2 Connector (for the Q26 Elite embedded module)

Pin #	Signal Name	I/O	I/O Type	Description
1	MIC2N	I	Analog	Microphone 2 negative input
2	SPKR_OUT_N	O	Analog	Speaker 2 negative output
3	SPKR_OUT_P	O	Analog	Speaker 2 positive output
4	MIC2P	I	Analog	Microphone 2 positive input

16.3. AUDIO Functions Description

The AUDIO functions may be electrically removed with special solder (unsoldered J602 to J609). Unsoldering J602 to J609 allows for the transmission of undisturbed signals via the external connector (J201).

By default, AUDIO signals are available on its dedicated connector, J601 (for AUDIO1) and J600 (for AUDIO2) with J602 to J609 soldered.

AUDIO signals in the Q26 Series Development Kit should be connected to their corresponding AUDIO signals in the Q26 embedded modules. That is, AUDIO1 signals in the embedded module should be connected to AUDIO1 in the development kit; and AUDIO2 signals in the embedded module should be connected to AUDIO2 in the development kit.

Refer to the following table for a summary of the AUDIO function configuration.

Table 23. AUDIO Configuration

Mode	Single-Ended	Differential
AUDIO2	NO	YES
AUDIO1	YES	NO

For more information about the AUDIO functions, refer to the corresponding embedded module document:

- document [2] Product Technical Specification and Customer Design Guidelines for AirPrime Q2686 Refreshed
- document [3] Product Technical Specification and Customer Design Guidelines for AirPrime Q2687 Refreshed
- document [4] AirPrime Q26 Elite Product Technical Specification and Customer Design Guideline
- document [7] Product Technical Specification and Customer Design Guidelines for AirPrime Q2698

17. DAC Function

Caution: *This feature is not available on the Q2686 Refreshed, Q26 Elite, and Q2698 embedded modules.*

The Q2687 Refreshed embedded module provides one Digital to Analog Converter, AUX-DAC. This is an 8-bit resolution DAC that ranges from 0V to 2.3V.

For further information, refer to document [3] Product Technical Specification and Customer Design Guidelines for AirPrime Q2687 Refreshed.

The functionality of the DAC depends on the embedded software version.

Table 24. Pin Description of the Digital to Analog Converter

Pin #	Signal Name	I/O*	I/O Type	Description
88	AUX-DAC	O	2V3	Digital to Analog Output

* According to embedded module view.

18. Antenna Function

The antenna is connected to the board via the UFL-SMA cable. The antenna cable is fitted with a UFL connector, allowing the connection to the board.

Three (3) UFL-SMA cables are provided with the Q26 Series Development Kit package.

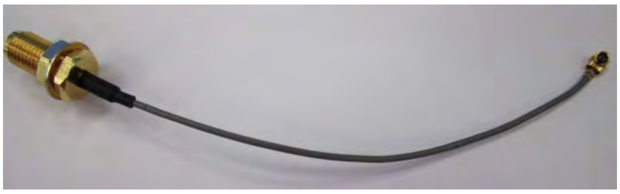


Figure 26. UFL-SMA Cable

18.1. GSM/WCDMA Antenna

The UFL connector can be connected to the embedded module as shown in the figure below.

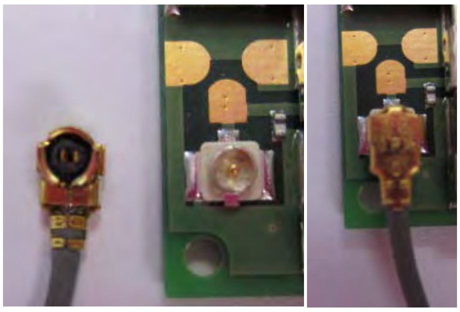


Figure 27. UFL Connector for use with a GSM/WCDMA Antenna

The SMA connector on the other end of the cable can then be connected to the GSM/WCDMA antenna that is also provided in the Q26 Series Development Kit package.

18.2. GPS Antenna

The UFL connector can be connected to the embedded module as shown in the figure below.



Figure 28. UFL Connector for use with a GPS Antenna

The SMA connector on the other end of the cable can then be connected to the GPS antenna that is also provided in the Q26 Series Development Kit package.

Note: The GPS antenna can only be used with the Q26 Elite embedded module.

19. ESD Functions

External ESD protections are added on the Q26 Series Development Kit for the following signals:

- SIM interface signals: SIMPRES, SIM-VCC, SIM-IO, SIM-CLK, and SIM-RST (±15kV, air discharge).
- USB interface signals: USB-DP and USB-DM (±15kV, air discharge).

Other interface signals protected on the embedded module are:

- UART1 signals with the ADM3307 transceiver (±15kV, air discharge)
- UART2 signals with the LTC2804 transceiver (±10kV, air discharge)

Warning: *As the test points at the center of the Q26 Series Development Kit are not protected against ESD discharge and they are directly connected to the signal pins of the Q26 series embedded module, users must be careful when using these TP signals.*

20. Current Measurement

To measure the current consumed by the embedded module, use the configuration enumerated in the sub-sections below and as shown in Figure 26 Configuration for the Current Measurement.

Caution: *Do not solder the special solder, J103.*

20.1. On UART1

- Remove R408
- Place R406=0Ω (like R408)

20.2. On UART2

- Remove R502 and R505
- Place R506=0Ω (like R502)
- The UART2 link is not used; therefore J501, J502, J503, and J504 must be open (by removing the solder)
- The switch UART2 must be switched to the "GPIO1" position

20.3. On BAT-TEMP

- Remove R100
- Plug an external power supply like VCC-EXT on "VBAT"(+) and (GND) on "GND"(-). This power supply may be set to 4V. Setting it up like this allows for peripherals to be used.

20.4. On USB

The USB link is not used; therefore J801, J802, J803, J805, and J806 must be open (by removing the solder).

With this configuration, the consumption current from VBATT is ONLY that of the embedded module plugged in.

For more information, refer to the following documents:

- document [2] Product Technical Specification and Customer Design Guidelines for AirPrime Q2686 Refreshed
- document [3] Product Technical Specification and Customer Design Guidelines for AirPrime Q2687 Refreshed
- document [4] AirPrime Q26 Elite Product Technical Specification and Customer Design Guideline
- document [7] Product Technical Specification and Customer Design Guidelines for AirPrime Q2698

Note: *Before doing any modification, ensure that the Q26 Series Development Kit is disconnected from the power supply during setup and configuration. Use pewter and a soldering iron (refer to WS80 from Weller) to solder.*

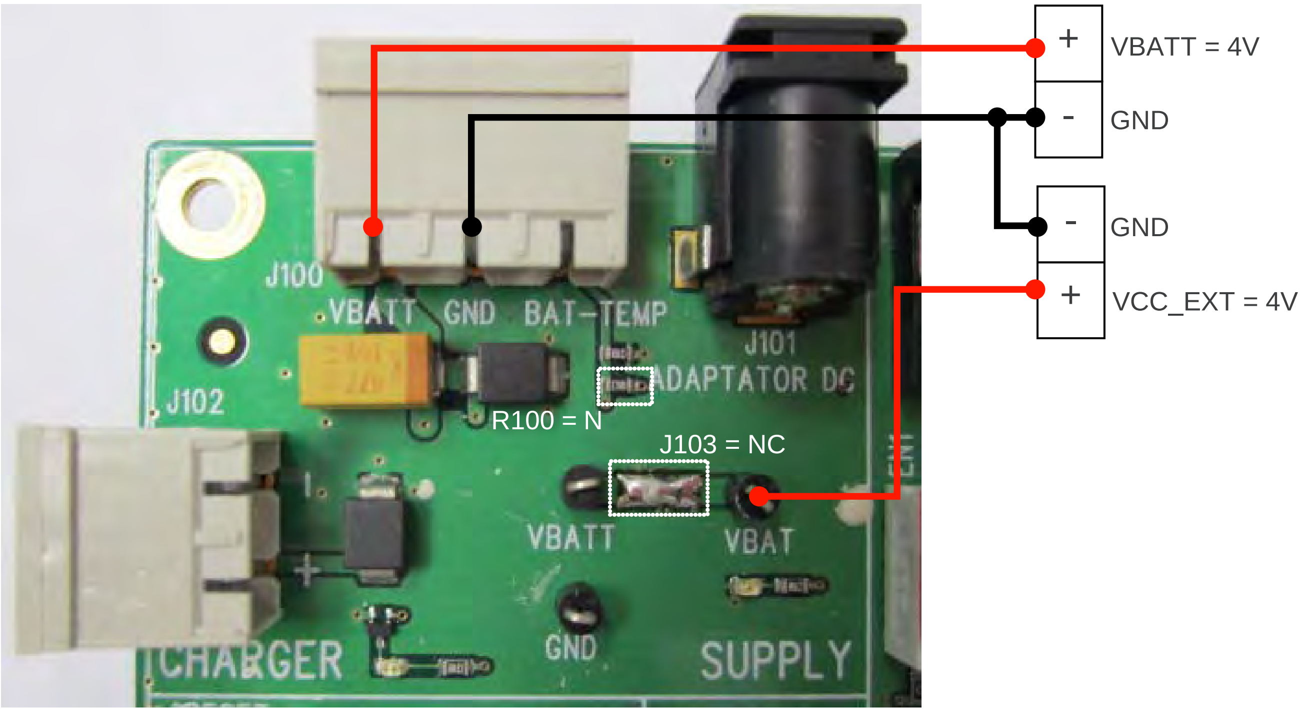


Figure 29. Configuration for the Current Measurement

21. Starting Procedure

21.1. Unpacking the Development Kit Components

The Q26 Series Development Kit box contains:

- 1 Q26 Series Development Kit board
- 2 AirPrime Q2687 Refreshed embedded modules
- Antenna
  - 1 SMA Antenna for GSM and WCDMA
  - 1 GPS Antenna

Note: The GPS antenna is only for use with the Q26 Elite embedded module.

- Connectors
  - 1 2-pin power supply connector
  - 5 100-pin board to board connectors
  - 1 130-pin board to board connector for the test board
- Cables
  - 1 Power cable
  - 3 UFL-SMA RF cables
  - 1 RS232 cable
  - 1 USB cable
  - 1 RJ9 cable (for handset)
- 1 AC/DC adapter
- 1 Handset
- 1 Pen drive containing the SDK + documentation

21.2. Setting the Accessories

Follow the instructions shown below step by step:

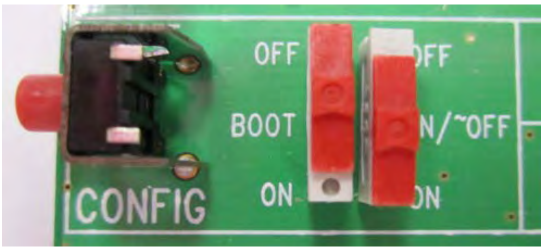
1. Insert a SIM or USIM card into the SIM card holder, **J700**, when using a Q2686 Refreshed, Q2687 Refreshed or Q2698 embedded module if communications are required.

   Insert a RUIM card into the SIM card holder, **J700**, when using a Q26 Elite embedded module if there is no carrier provisioned inside the Q26 Elite and if communications are required.



2. Make sure that:

- The "ON/OFF" switch is in the "ON" position
- The "BOOT" switch is in the "OFF" position

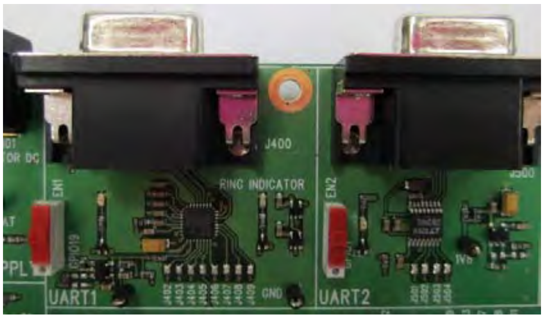


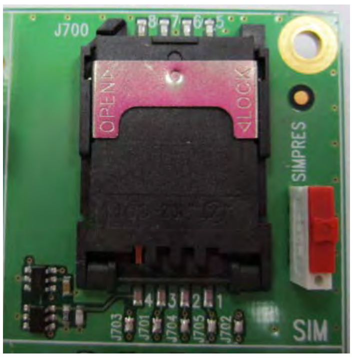
3. Also make sure that:

- The UART1 switch is in the "EN1" position.
- The UART2 switch is in the "EN2" position.
- The SIM switch is in the "SIMPRES" position.

Note: SIMPRES is not available for the Q26 Elite.

- All special solders are soldered.





4. Connect the RS232 cable, provided with the Q26 Series Development Kit, between the PC port and **J400** of the board.

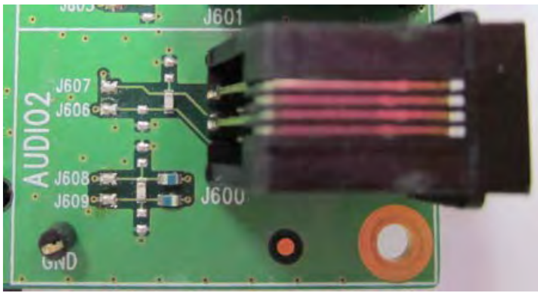
Note:	*By default, baud rate = 115.2Kbps, data bits = 8, parity = N, and stop bits = 1.*



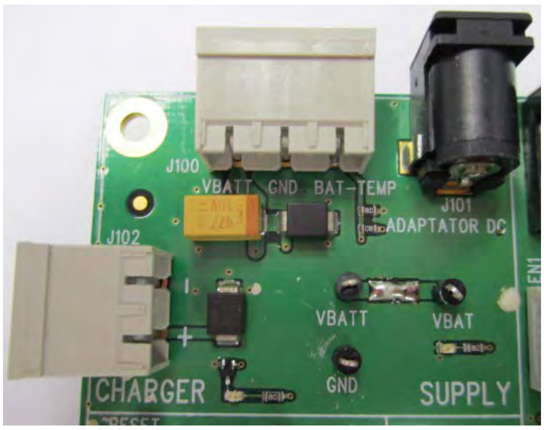
5. Use the UFL-SMA RF cable and connect one end to the embedded module; and the other end to an appropriate antenna depending on which Q26 series embedded module is being used.

Note:	*The antenna would vary depending on the embedded module used. Refer to the corresponding module specification document in section 1.2.1 Reference Documents for more information.*

6. Connect the handset, provided with the Q26 Series Development Kit, to the Main AUDIO connector, **J600** (if communications are required).



7. Plug the power supply via the adapter, J101 or via the external power supply, J100 at 4V/2.5A.



21.3. Communication Test

To perform a communications test after setting the Q26 Series Development Kit with a Q26 series embedded module, do the following:

1. Using a PC terminal emulator, send the following command on the COM port to communicate with the Q26 series embedded module:

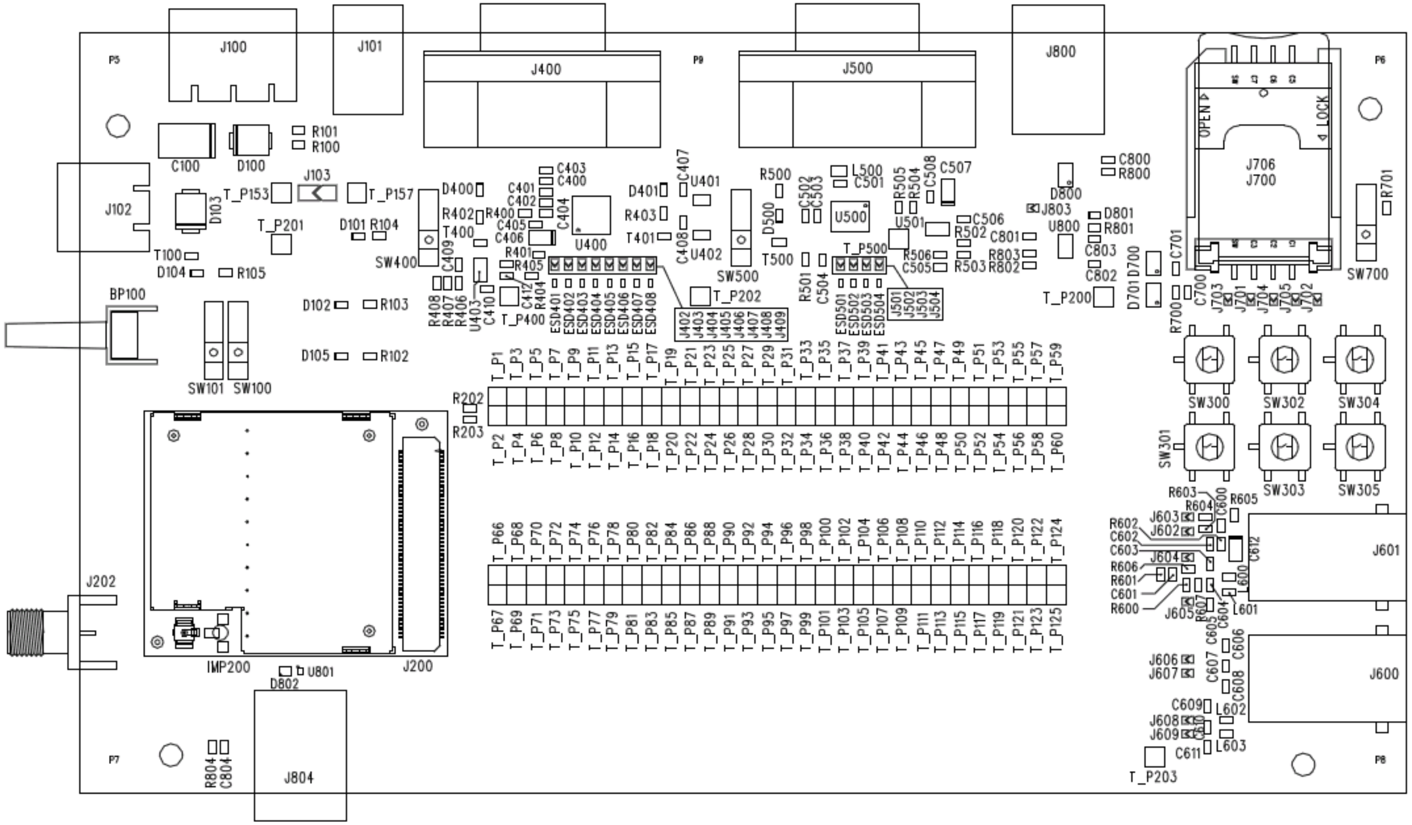
   AT↵

2. When communications is established between the PC and the embedded module, the embedded module replies with an "OK". The message is displayed in the terminal emulator window.

For more information, refer to the following documents:

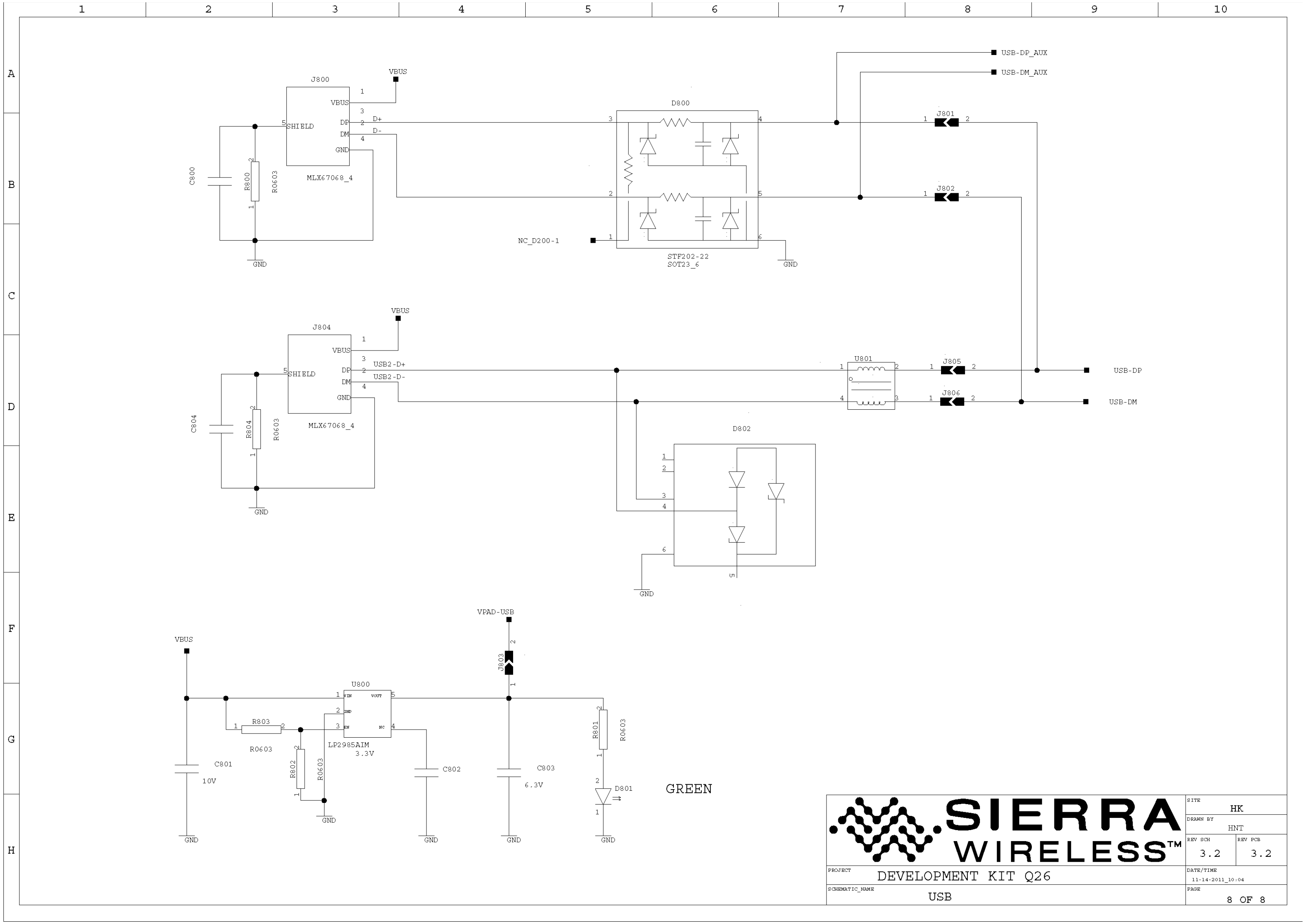
- document [2] Product Technical Specification and Customer Design Guidelines for AirPrime Q2686 Refreshed
- document [3] Product Technical Specification and Customer Design Guidelines for AirPrime Q2687 Refreshed
- document [4] AirPrime Q26 Elite Product Technical Specification and Customer Design Guideline
- document [7] Product Technical Specification and Customer Design Guidelines for AirPrime Q2698

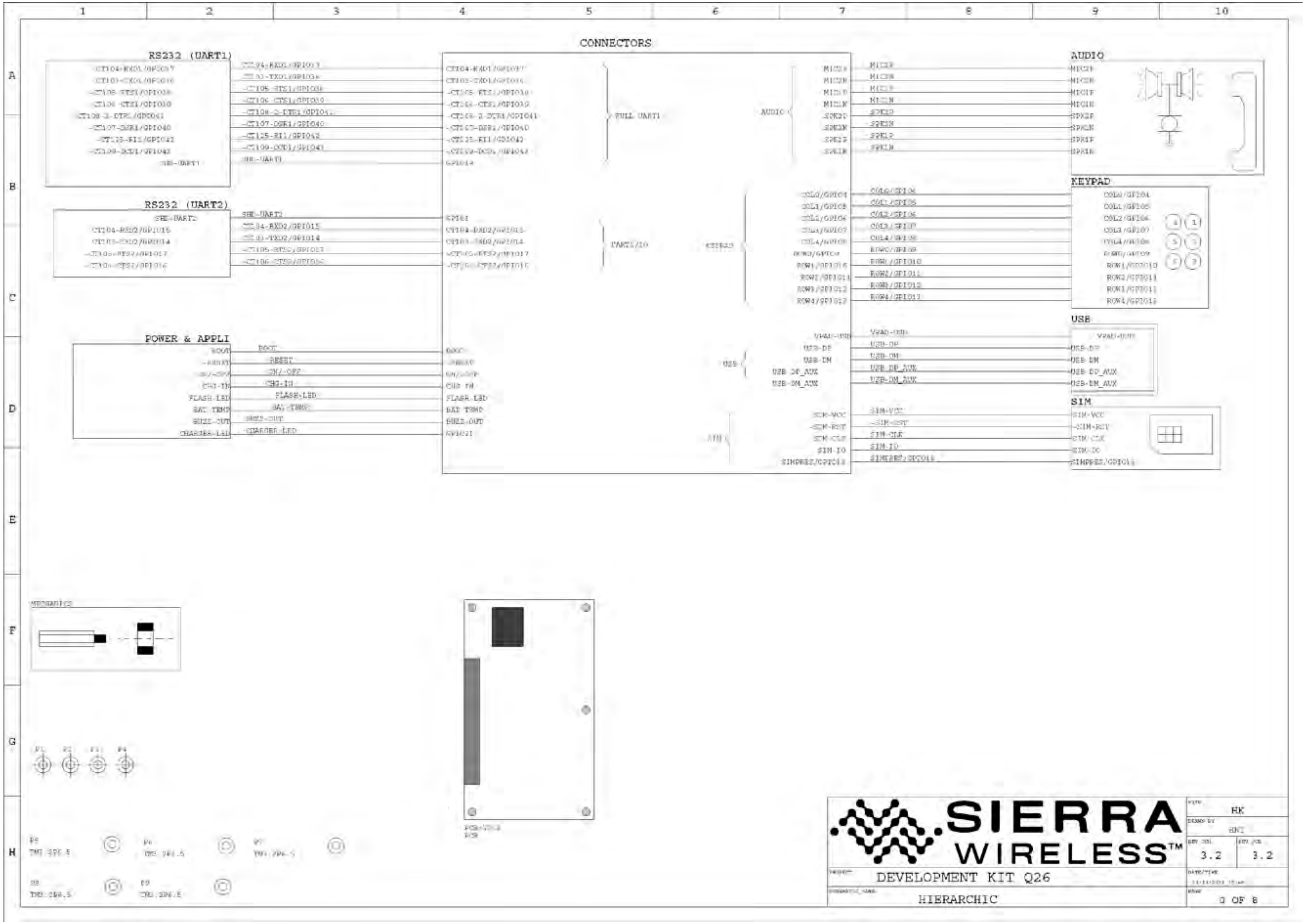
22. Appendix

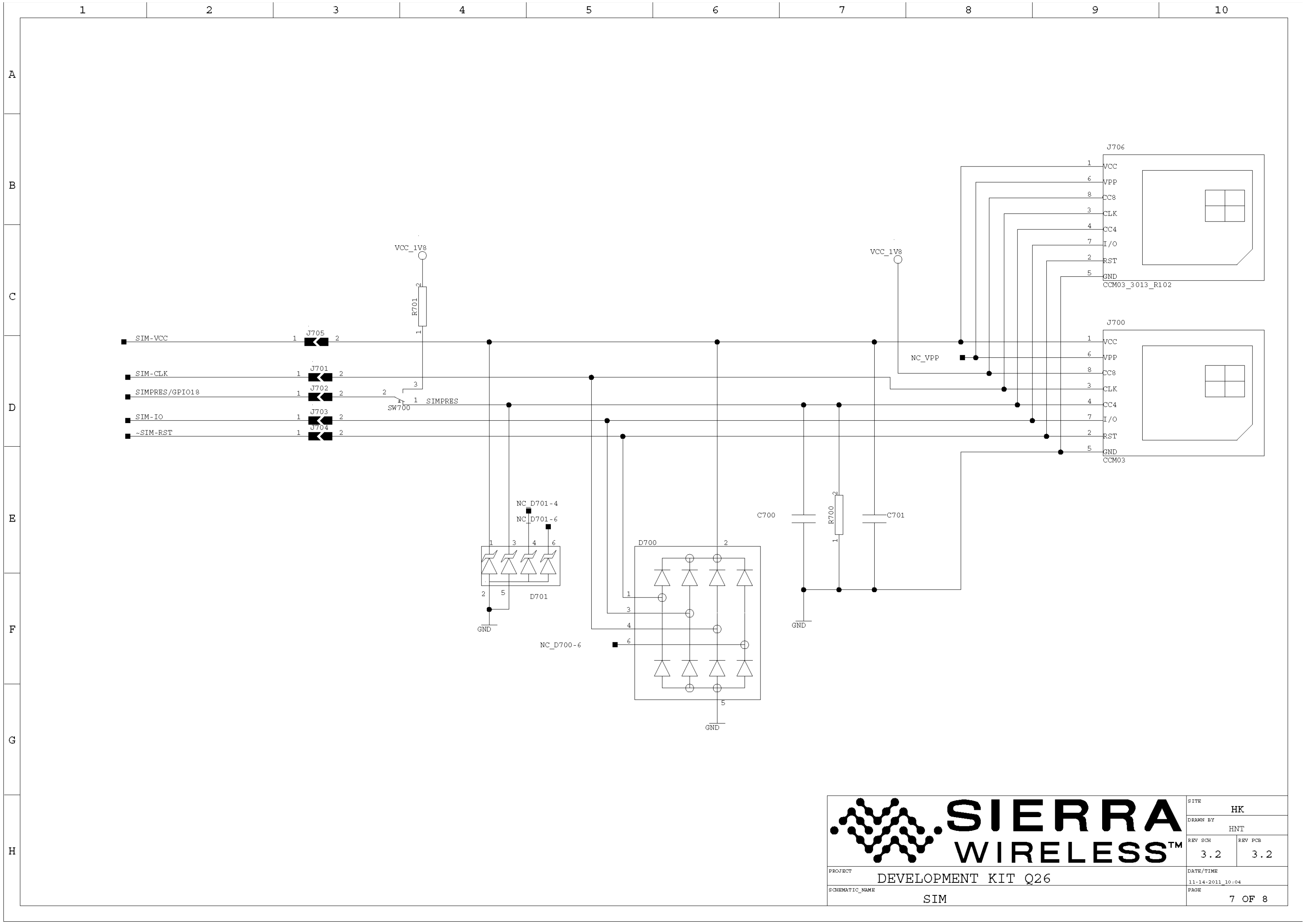


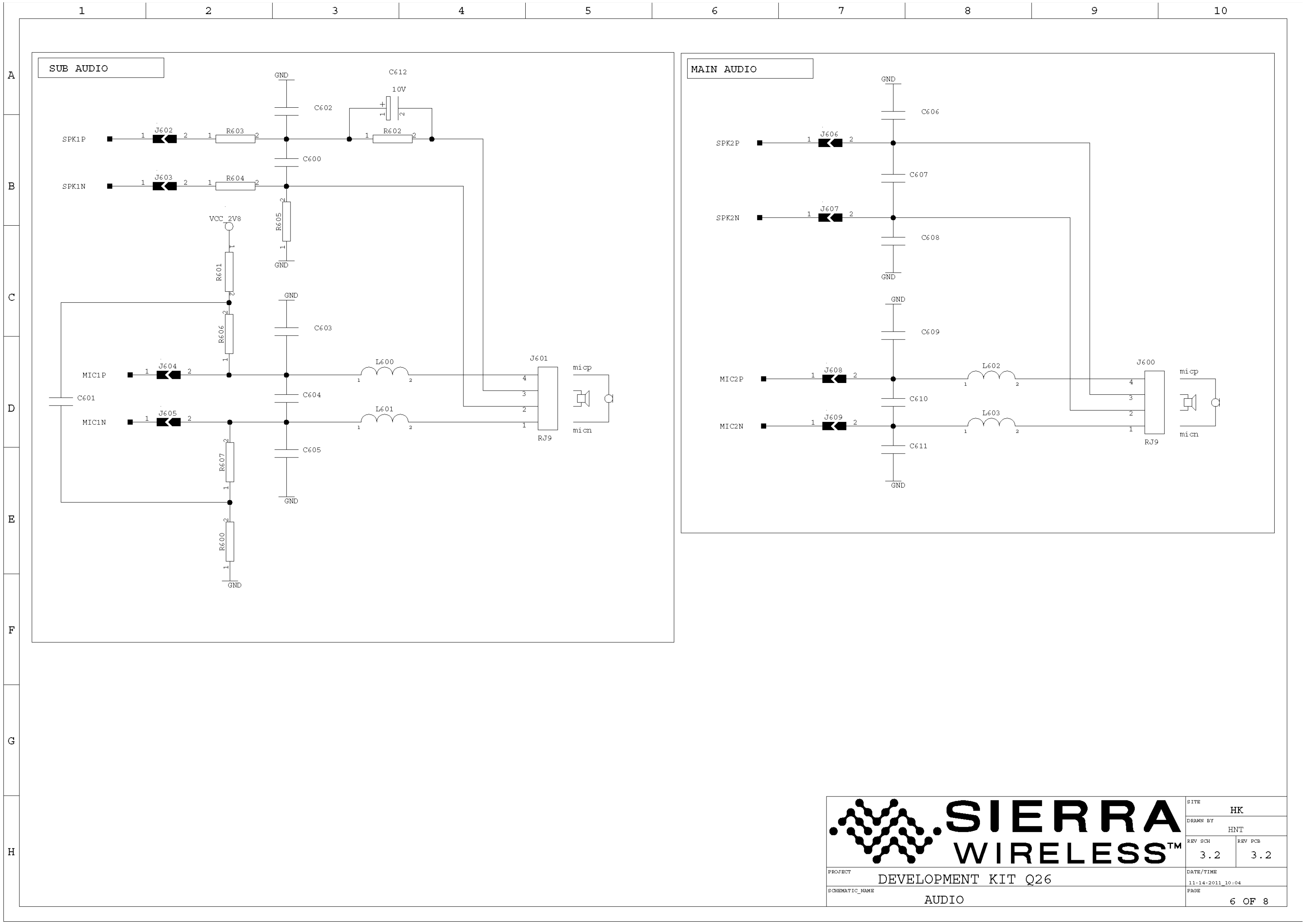
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ENG	JCO / HER / HNT	
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PROJECT	DEVELOPMENT KIT Q26	FORMAT --
N° D'IDENTIFIANT	1400666 - B	

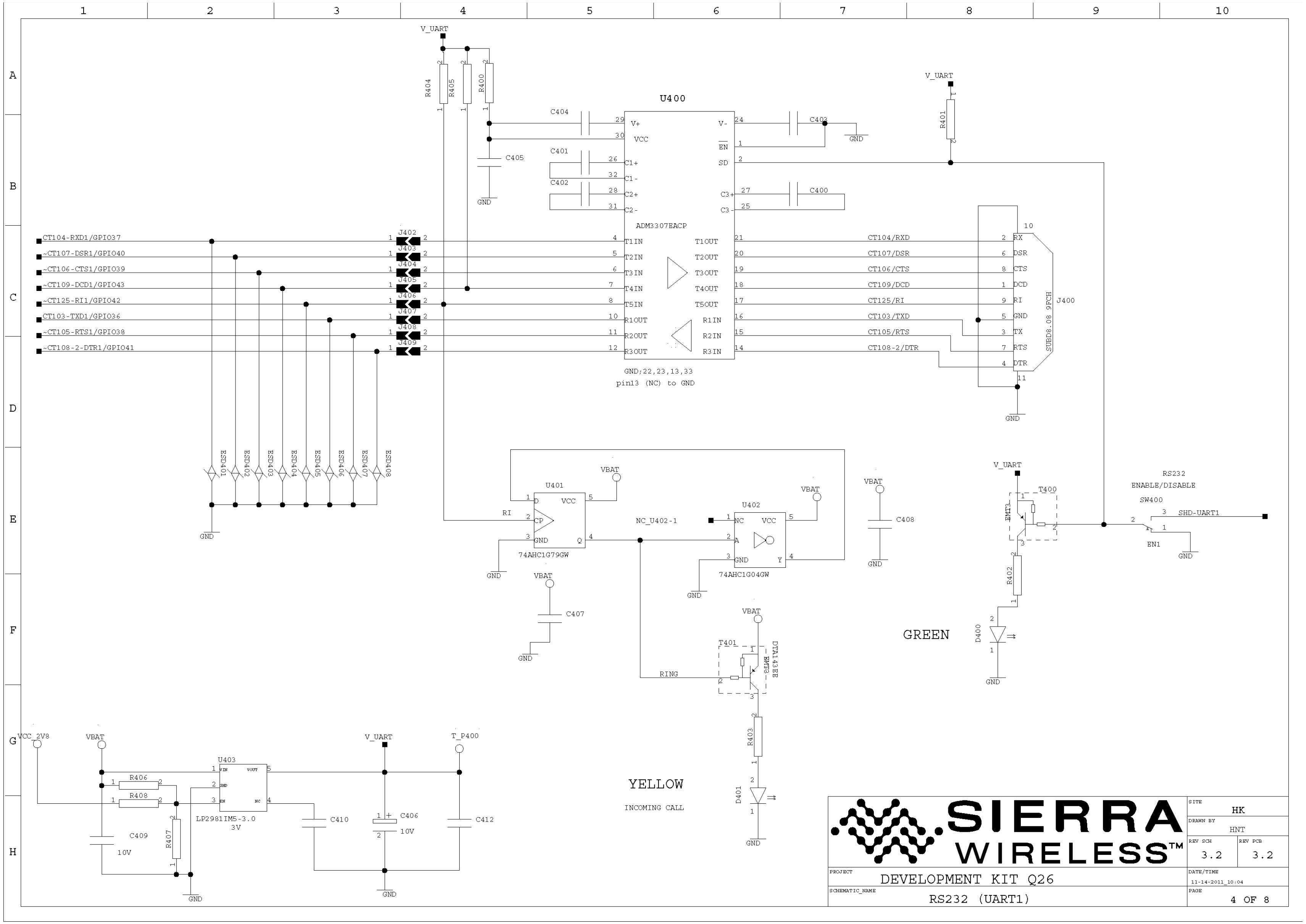
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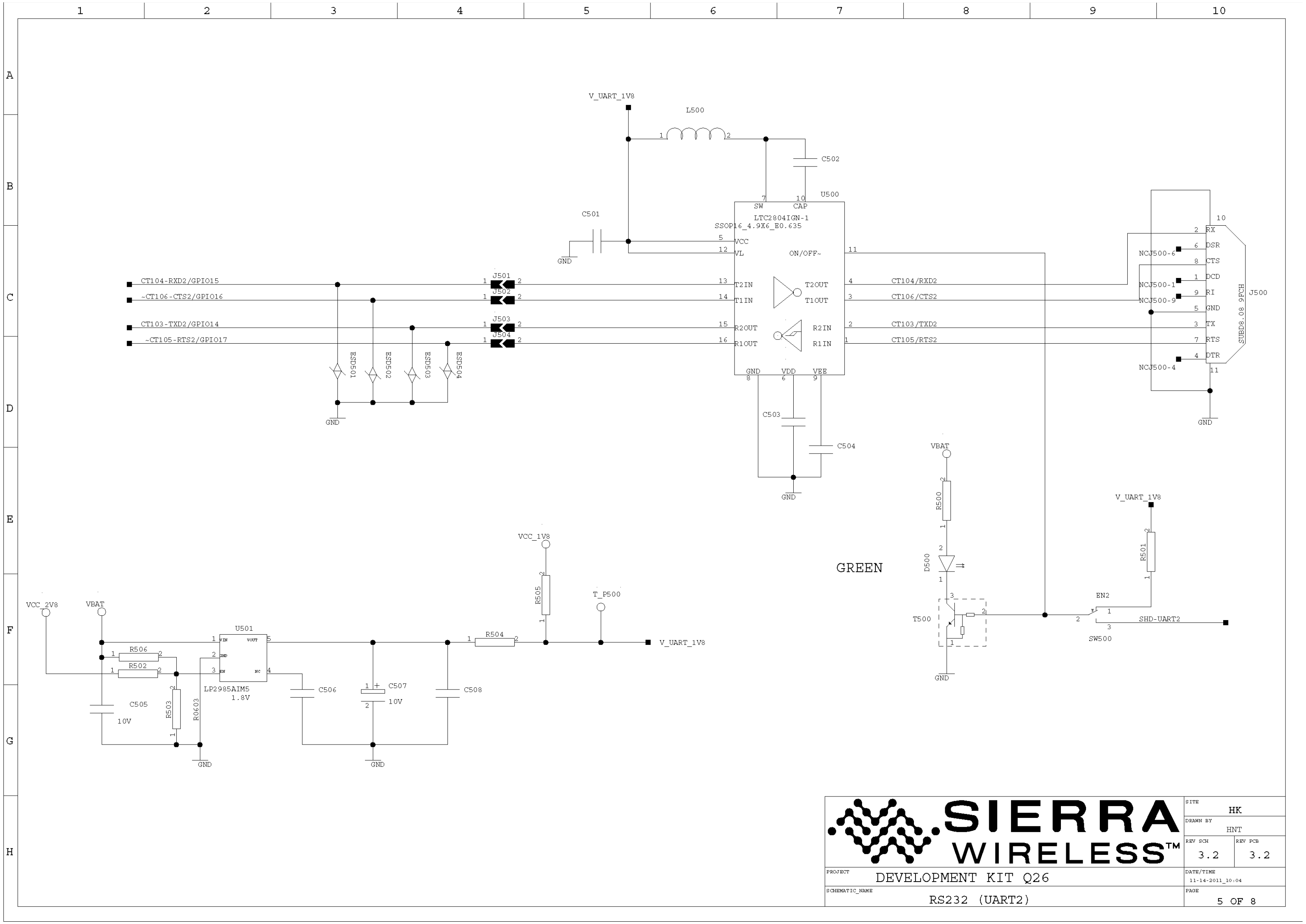

USB-DP_AUX
USB-DM_AUX
VBUS
J800
VBUS
SHIELD
DP
DM
GND
D+
D-
MLX67068_4
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R0603
D800
J801
J802
NC_D200-1
STF202-22
SOT23_6
GND
J804
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USB2-D-
C804
R804
U801
J805
J806
USB-DP
USB-DM
D802
VPAD-USB
J803
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R803
R0603
LP2985AIM
3.3V
R802
C801
10V
C802
C803
6.3V
R801
D801
GREEN
SIERRA WIRELESS™
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3.2
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DATE/TIME
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USB
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8 OF 8

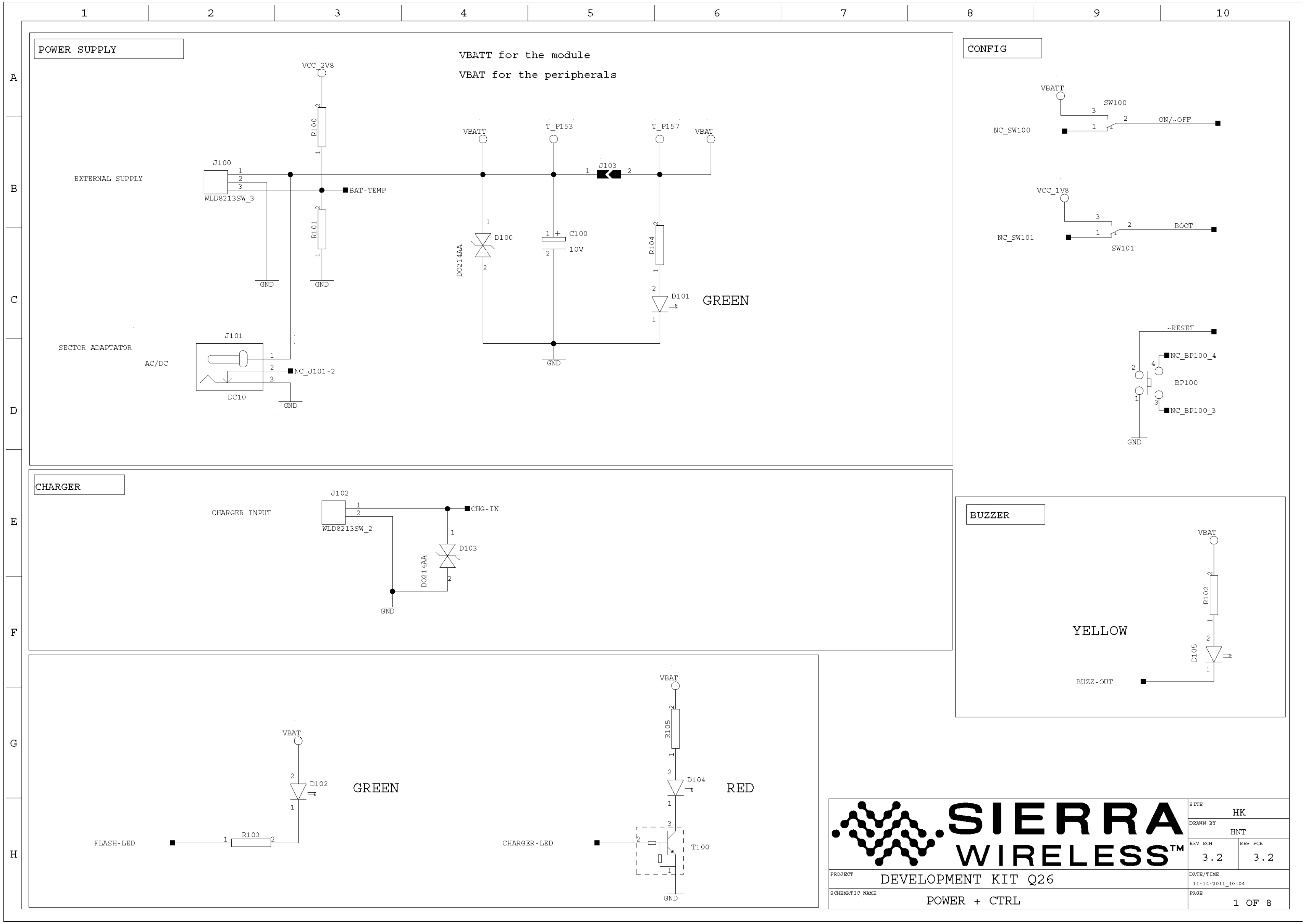

CONNECTORS
RS232 (UART1)
RS232 (UART2)
POWER & APPLI
AUDIO
KEYPAD
USB
SIM
FULL UART1
UART2/IO
KEYPAD
SIERRA WIRELESS™
DEVELOPMENT KIT Q26
HIERARCHIC
3.2
3.2
0 OF 8

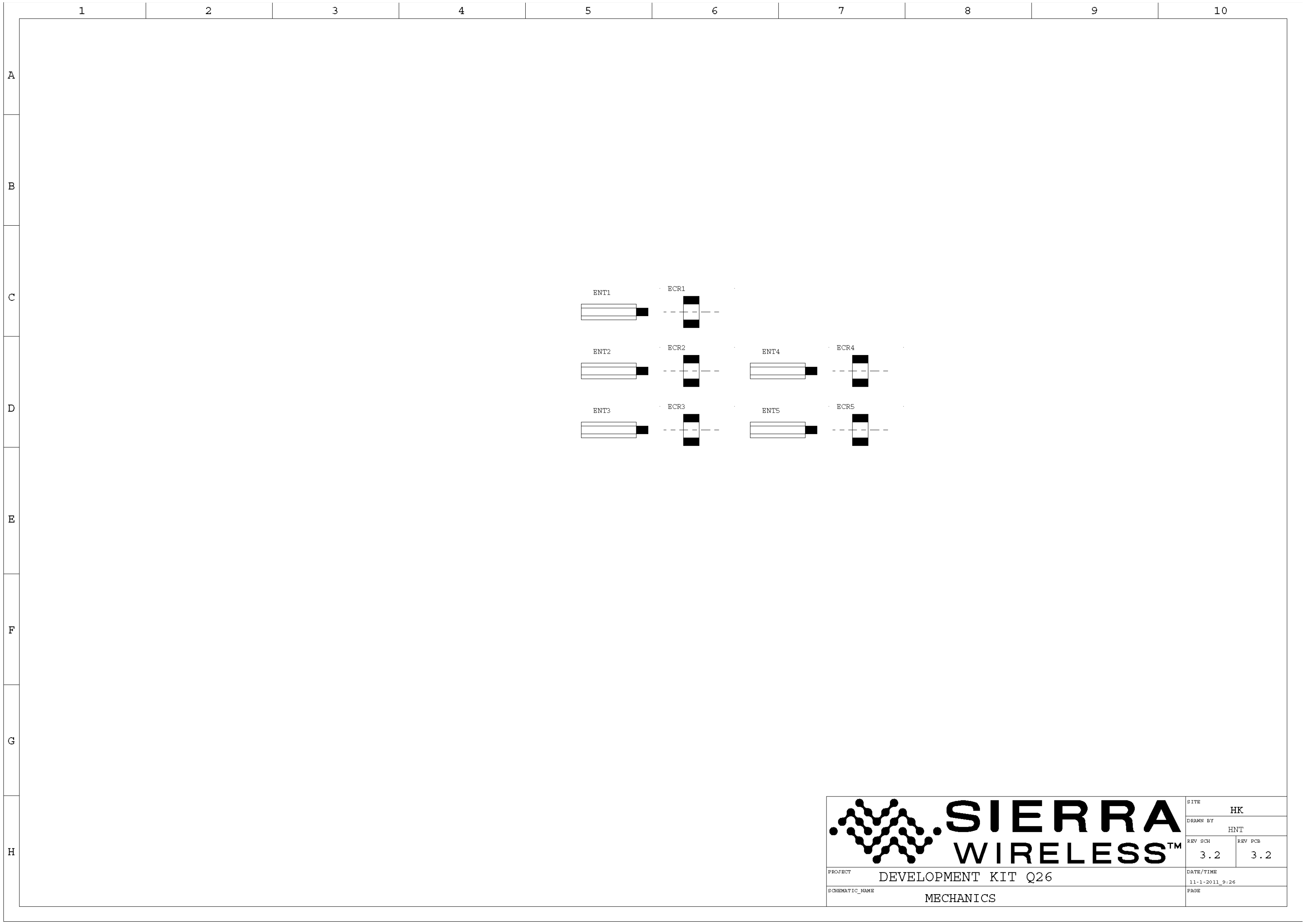

SIM-VCC
SIM-CLK
SIMPRES/GPIO18
SIM-IO
~SIM-RST
J705
J701
J702
J703
J704
SW700
SIMPRES
VCC_1V8
R701
J706
CCM03_3013_R102
J700
CCM03
NC_VPP
C700
R700
C701
D700
D701
NC_D701-4
NC_D701-6
NC_D700-6
GND
VCC
VPP
CC8
CLK
CC4
I/O
RST
SIERRA WIRELESS™
SITE HK
DRAWN BY HNT
REV SCH 3.2
REV PCB 3.2
PROJECT DEVELOPMENT KIT Q26
SCHEMATIC_NAME SIM
DATE/TIME 11-14-2011_10:04
PAGE 7 OF 8

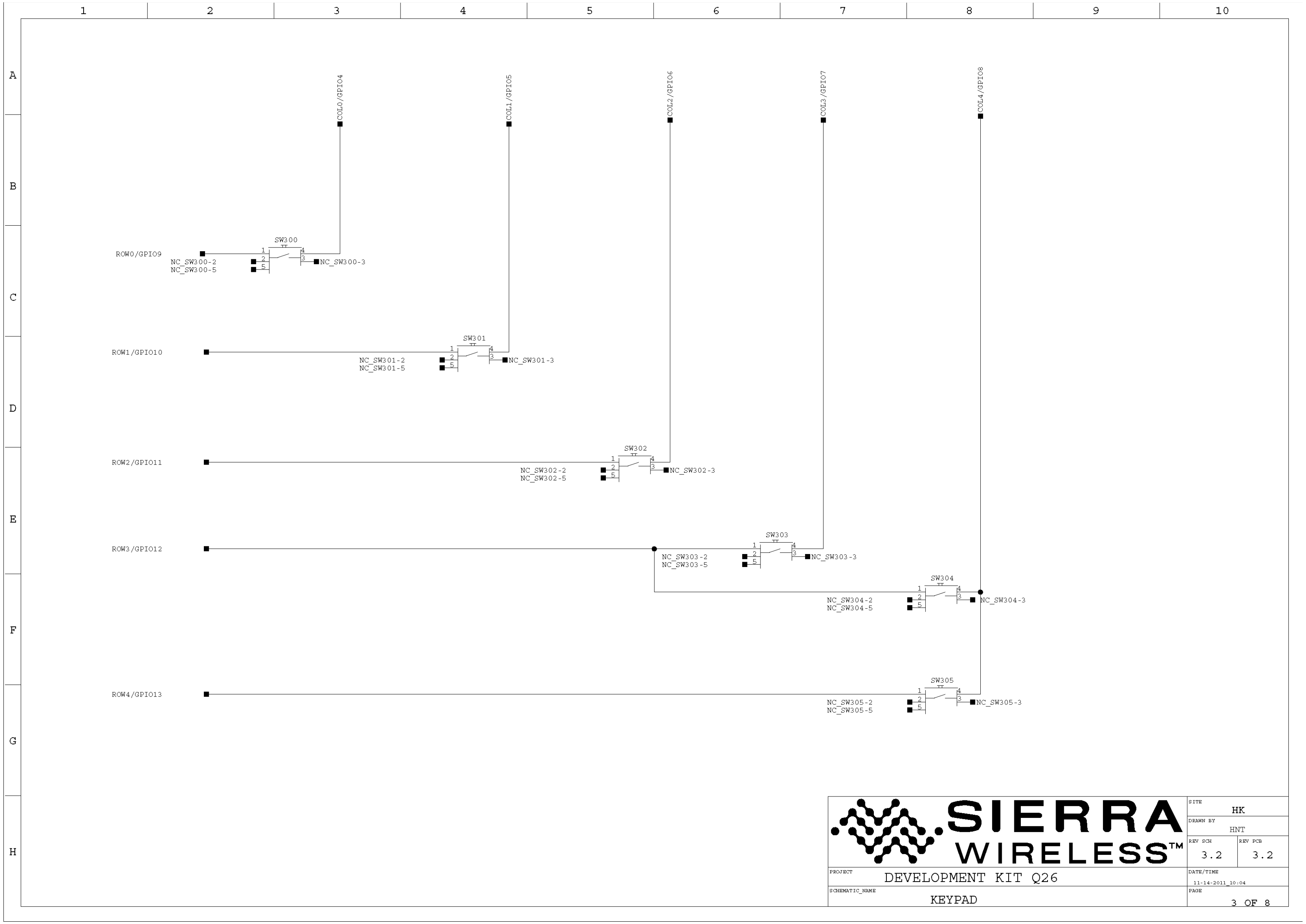

SUB AUDIO
MAIN AUDIO
SPK1P
SPK1N
MIC1P
MIC1N
SPK2P
SPK2N
MIC2P
MIC2N
VCC_2V8
GND
J601
J600
RJ9
micp
micn
SIERRA WIRELESS
HK
HNT
3.2
3.2
DEVELOPMENT KIT Q26
AUDIO
6 OF 8

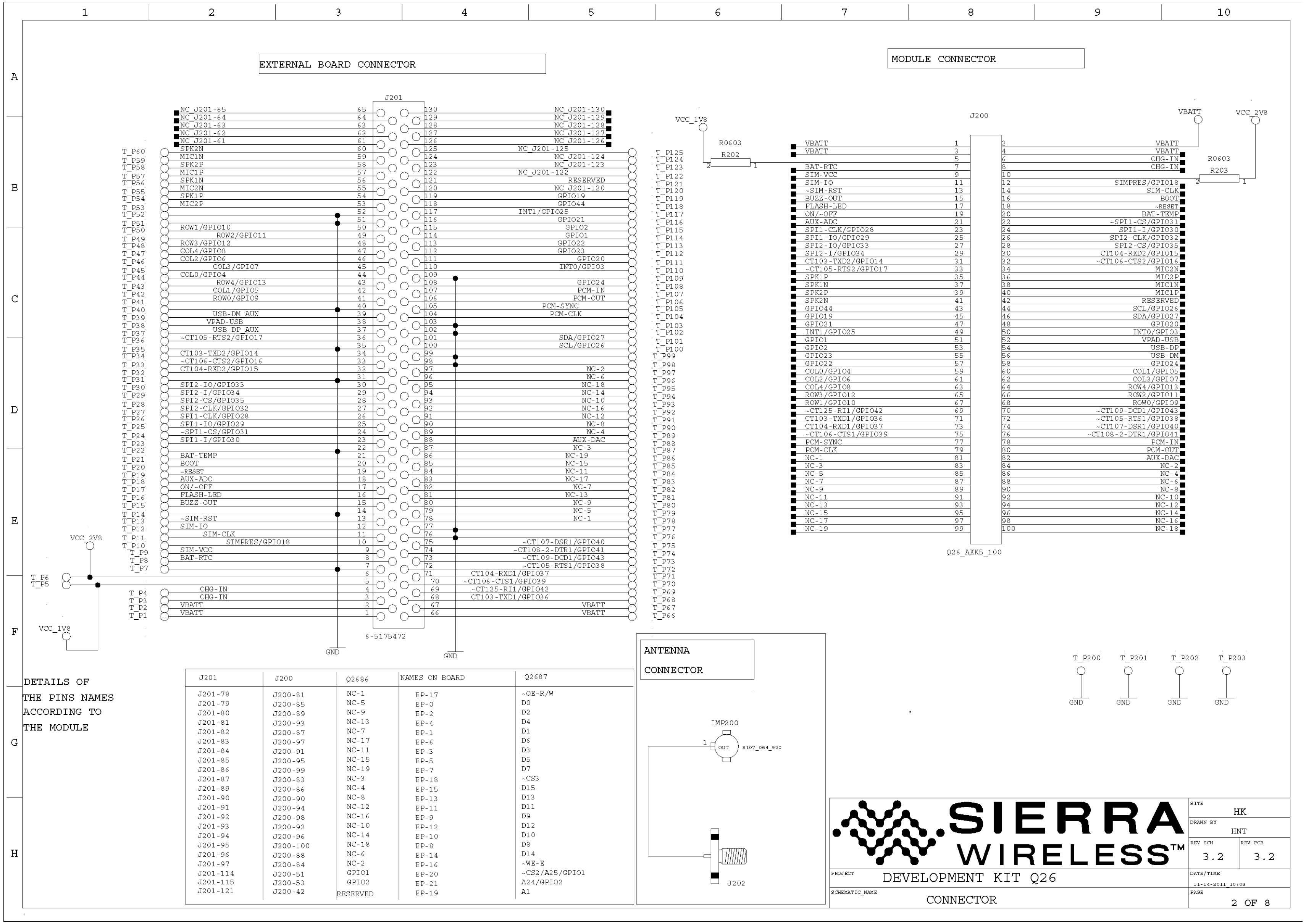

U400
ADM3307EACP
U401
74AHC1G79GW
U402
74AHC1G04GW
U403
LP2981IM5-3.0
J400
SUBD8.08 9PCH
SW400
RS232
ENABLE/DISABLE
GREEN
YELLOW
INCOMING CALL
SIERRA WIRELESS
DEVELOPMENT KIT Q26
RS232 (UART1)
4 OF 8


V_UART_1V8
L500
C502
U500
LTC2804IGN-1
SSOP16_4.9X6_E0.635
C501
CT104-RXD2/GPIO15
~CT106-CTS2/GPIO16
CT103-TXD2/GPIO14
~CT105-RTS2/GPIO17
J501
J502
J503
J504
ESD501
ESD502
ESD503
ESD504
CT104/RXD2
CT106/CTS2
CT103/TXD2
CT105/RTS2
J500
SUBD8.08 9FCH
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C504
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D500
GREEN
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R501
EN2
SHD-UART2
SW500
VCC_1V8
R505
T_P500
VCC_2V8
U501
R506
R502
C505
R503
R0603
LP2985AIM5
1.8V
C506
C507
C508
R504
GND
SIERRA WIRELESS™
SITE
HK
DRAWN BY
HNT
REV SCH
3.2
REV PCB
3.2
PROJECT
DEVELOPMENT KIT Q26
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SCHEMATIC_NAME
RS232 (UART2)
PAGE
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POWER SUPPLY
VBATT for the module
VBAT for the peripherals
VCC_2V8
EXTERNAL SUPPLY
J100
WLD8213SW_3
BAT-TEMP
R100
R101
GND
VBATT
T_P153
T_P157
VBAT
J103
D100
D0214AA
C100
10V
R104
D101
GREEN
SECTOR ADAPTATOR
AC/DC
J101
NC_J101-2
DC10
CONFIG
SW100
ON/-OFF
NC_SW100
VCC_1V8
BOOT
NC_SW101
SW101
~RESET
NC_BP100_4
BP100
NC_BP100_3
CHARGER
CHARGER INPUT
J102
WLD8213SW_2
CHG-IN
D103
BUZZER
R102
YELLOW
D105
BUZZ-OUT
D102
GREEN
FLASH-LED
R103
R105
D104
RED
CHARGER-LED
T100
SIERRA WIRELESS™
SITE
HK
DRAWN BY
HNT
REV SCH
3.2
REV PCB
3.2
PROJECT
DEVELOPMENT KIT Q26
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SCHEMATIC_NAME
POWER + CTRL
PAGE
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ENT1
ECR1
ENT2
ECR2
ENT4
ECR4
ENT3
ECR3
ENT5
ECR5
SIERRA WIRELESS™
SITE
HK
DRAWN BY
HNT
REV SCH
3.2
REV PCB
3.2
PROJECT
DEVELOPMENT KIT Q26
DATE/TIME
11-1-2011_9:26
SCHEMATIC_NAME
MECHANICS
PAGE


COL0/GPIO4
COL1/GPIO5
COL2/GPIO6
COL3/GPIO7
COL4/GPIO8
ROW0/GPIO9
ROW1/GPIO10
ROW2/GPIO11
ROW3/GPIO12
ROW4/GPIO13
SW300
SW301
SW302
SW303
SW304
SW305
NC_SW300-2
NC_SW300-5
NC_SW300-3
NC_SW301-2
NC_SW301-5
NC_SW301-3
NC_SW302-2
NC_SW302-5
NC_SW302-3
NC_SW303-2
NC_SW303-5
NC_SW303-3
NC_SW304-2
NC_SW304-5
NC_SW304-3
NC_SW305-2
NC_SW305-5
NC_SW305-3
SIERRA WIRELESS™
SITE HK
DRAWN BY HNT
REV SCH 3.2
REV PCB 3.2
PROJECT DEVELOPMENT KIT Q26
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SCHEMATIC_NAME KEYPAD
PAGE 3 OF 8



J201	J200	Q2686	NAMES ON BOARD	Q2687
J201-78	J200-81	NC-1	EP-17	~OE-R/W
J201-79	J200-85	NC-5	EP-0	D0
J201-80	J200-89	NC-9	EP-2	D2
J201-81	J200-93	NC-13	EP-4	D4
J201-82	J200-87	NC-7	EP-1	D1
J201-83	J200-97	NC-17	EP-6	D6
J201-84	J200-91	NC-11	EP-3	D3
J201-85	J200-95	NC-15	EP-5	D5
J201-86	J200-99	NC-19	EP-7	D7
J201-87	J200-83	NC-3	EP-18	~CS3
J201-89	J200-86	NC-4	EP-15	D15
J201-90	J200-90	NC-8	EP-13	D13
J201-91	J200-94	NC-12	EP-11	D11
J201-92	J200-98	NC-16	EP-9	D9
J201-93	J200-92	NC-10	EP-12	D12
J201-94	J200-96	NC-14	EP-10	D10
J201-95	J200-100	NC-18	EP-8	D8
J201-96	J200-88	NC-6	EP-14	D14
J201-97	J200-84	NC-2	EP-16	~WE-E
J201-114	J200-51	GPIO1	EP-20	~CS2/A25/GPIO1
J201-115	J200-53	GPIO2	EP-21	A24/GPIO2
J201-121	J200-42	RESERVED	EP-19	A1

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WIRELESS